

# Memorandum

Date: June 29, 2010  
Telephone: (916) 654-4781  
File: 09-AFC-5

To: Commissioner Anthony Eggert, Presiding Member  
Vice Chair James Boyd, Associate Member  
Kourtney Vaccaro, Hearing Officer

<b>DOCKET</b>	
<b>09-AFC-5</b>	
DATE	<u>JUN 29 2010</u>
REC'D	<u>JUN 29 2010</u>

From: California Energy Commission - Craig Hoffman  
1516 Ninth Street Siting Project Manager  
Sacramento, CA 95814-5512

Subject: **ABENGOA MOJAVE SOLAR 09-AFC-5**

## **ENERGY COMMISSION STAFF’S REBUTTAL TESTIMONY TO THE APPLICANT’S OPENING TESTIMONY – DECLARATIONS AND RESUMES (Exhibit 306)**

Energy Commission staff is providing declarations and resumes for rebuttal testimony that was published on June 17, 2010. (Exhibit 306) These declarations and resumes are a part of Exhibit 306.

Declarations and Resumes are provided for the following technical sections:

- Biological Resources - Heather Blair
- Hazardous Materials – Alvin J. Greenberg, Ph.D.
- Noise and Vibration - Shahab Khoshmashrab
- Soils and Water Resources – Christopher B. Dennis, John L. Fio, Eugene B. Yates and Mike Conway
- Traffic and Transportation - Steven J. Brown
- Visual Resources - Thomas Packard, William D. Kanemoto and James Jewell
- Waste Management – Ellen Townsend-Hough
- Worker Safety and Fire Protection - Alvin J. Greenberg, Ph.D.

cc: Proof of Service List  
Docket 09-AFC-5

**DECLARATION OF  
Heather Blair**

I, Heather Blair, declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the Siting, Transmission and Environmental Protection Division.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff rebuttal testimony on the **Biological Resources** for the **Abengoa Mojave Solar** project (09-AFC-5) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010

Signed: Original signed by H. Blair

At: Sacramento, California



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**HEATHER BLAIR**  
Environmental Scientist

### ACADEMIC BACKGROUND

M.S., Conservation Biology, Sacramento State University, In Progress  
B.S., Ecology, San Diego State University, 2004

### PROFESSIONAL EXPERIENCE

Heather Blair is an Environmental Scientist experienced in a range of natural resource investigations and environmental impact analysis including botanical and wildlife research, inventory, and survey techniques; technical writing; and data analysis. She has experience preparing environmental documents pursuant to applicable federal, state and local environmental regulations, including the California Environmental Quality Act, National Environmental Policy Act, and the California and federal Endangered Species Acts.

#### Aspen Environmental Group

**2004 to present**

Selected project experience at Aspen includes the following:

#### Power Generation and Transmission Interconnection Projects

- › **California Energy Commission.** Aspen has a multi-year contract to provide support to the Energy Facility Planning and Licensing Programs. Under this contract Ms. Blair has participated in the following projects:
  - › **Biological Resources Assessment for the Abengoa Mojave Solar Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 250 MW power plant in the Mojave Desert. Important biological issues include impacts to Harper Dry Lake from potentially decreased water availability, desert tortoise, and Mojave ground squirrel.
  - › **Biological Resources Assessment for the San Joaquin Solar 1&2 Hybrid Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 107 MW solar thermal/biomass hybrid power plant. Important biological issues include potential impacts to San Joaquin kit fox habitat and movement corridor connectivity.
  - › **Biological Resources Assessment for the Genesis Solar Energy Project.** Ms. Blair is currently serving as the assistant technical staff for the analysis of impacts to biological resources from the 250 MW power plant in an undeveloped area of the Sonoran Desert. Important biological issues include direct and indirect (downstream) impacts to ephemeral drainages from site development and indirect impacts to sand dune dependent vegetation and wildlife communities from disruption of Aeolian processes.
  - › **Biological Resources Assessment for the Carlsbad Energy Center.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 540 MW CECP. Important biological issues include potential impacts to Agua Hedionda Lagoon and consistency with the Carlsbad Habitat Management Plan. Ms. Blair recently testified as an expert witness in biological resources during Evidentiary Hearings before the Commission.
  - › **Biological Resources Assessment for the CPV Sentinel Project.** Ms. Blair served as the lead technical staff for the analysis of impacts to biological resources from the 850 MW CPV Sentinel project. Important biological issues include potential impacts from groundwater drawdown to the mesquite hummock plant community and the special-status species it supports.
  - › **Biological Resources Assessment for the CPV Vaca Station Project.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 660 MW CPVVS.

Important biological issues include potential impacts to giant garter snake from reduced flows in Old Almao Creek and loss of Swainson's hawk foraging habitat.

- › **Biological Resources Assessments for the Marsh Landing and Willow Pass Generating Stations.** Ms. Blair is currently serving as the lead technical staff for the analysis of impacts to biological resources from the 930 MW MLGS and 550 MW WPGS. Important biological issues include potential indirect impacts to listed plant species in the Antioch Dunes National Wildlife Refuge from nitrogen deposition.
- › **Biological Resources Assessments for the Panoche and Starwood Energy Centers.** Ms. Blair served as the lead technical staff for the analysis of impacts to biological resources from the 400 MW Panoche Energy Center and 120 MW Starwood Project. These projects required coordination with USFWS and CDFG regarding impacts to the State and federally listed San Joaquin kit fox.
- › **Northern California CO<sub>2</sub> Storage Pilot, Confidential Client, CEQA and NEPA compliance, (2008).** Contributed to the preparation of Department of Energy NEPA environmental questionnaire to comply with Category Exclusion requirements and preparation of the Initial Statement under CEQA for the proposed CO<sub>2</sub> sequestration pilot test site in Montezuma Hills, California. Ms. Blair conducted focused nesting surveys of the State-threatened Swainson's hawk (*Buteo swainsonii*).
- › **Arizona Utilities CO<sub>2</sub> Storage Pilot, CEC and University of California, NEPA compliance, (2007).** Contributed to the preparation of Department of Energy NEPA environmental questionnaire to comply with Category Exclusion requirements for the proposed CO<sub>2</sub> sequestration pilot test site near Joseph City, Arizona. Ms. Blair conducted focused surveys of the federally endangered Peebles Navajo cactus (*Pediocactus peeblesianus* var. *peeblesianus*).
- › **Environmental Screening Tool for Out-of-State Renewables, KEMA and CEC, Staff (2009).** Assessed the potential for California laws, ordinance, regulations and standards to be impacted by out-of-state renewable facilities seeking RPS certification. Ms. Blair prepared the assessment of impacts associated with geothermal projects.
- › **Nuclear Power Plant Assessment (Assembly Bill 1632).** Ms. Blair managed the preparation of and was a contributing author for a major Appendix to the Nuclear Power Plan Assessment Report for the Energy Commission. This report evaluated nuclear power issues in the state in response to recent legislation (AB 1632), including environmental issues associated with alternatives (including renewable) to the state's two nuclear facilities.
- › **Diablo Canyon Power Plant Steam Generator Replacement Project.** Ms. Blair supported the management team in preparing the project description, alternatives and supporting sections of the Draft and Final EIR.

#### Transmission Line and Substation Projects

- › **Sunrise Powerlink Transmission Line Project.** Under contract to the California Public Utilities Commission (CPUC), Aspen prepared an EIR/EIS for a 150-mile proposed transmission line from Imperial Valley Substation, near El Centro, California, to Peñasquitos Substation in northwestern San Diego County. The Proposed Project would potentially deliver renewable resources from the Imperial Valley via a 500 kV transmission line to a new 500/230 kV substation, and from the new substation to western San Diego via 230 kV overhead and underground transmission lines. Ms. Blair analyzed the impacts to wilderness and recreation. Additionally, she wrote the project description and assisted with overall project support.
- › **TANC Transmission Project.** Aspen was awarded a contract with the Transmission Agency of Northern California (TANC) for CEQA/NEPA and environmental permitting support for 600-miles of proposed 500 and 230 kV transmission lines between Lassen County and Santa Clara County, California. The project included evaluation of over 600 additional miles of alternative routes, six new substations, and modifications to six existing substations. Ms. Blair was the Deputy Project Manager, responsible for coordinating the biological and cultural resource field surveys. The project was cancelled in July 2009.

- › **Sacramento Area Voltage Support Project.** Under contract to Western Area Power Administration (Western) and in cooperation with SMUD, Aspen prepared an SEIS and EIR for a double-circuit 230 kV circuit between Western's O'Banion/Sutter Power Plant and Elverta Substation/Natomas Substation. Ms. Blair was part of the project management team and managed the wetland delineation, Biological Survey Report, and Biological Evaluation.
- › **North Area ROW Maintenance Project.** Under contract to Western, Ms. Blair is currently providing project support to prepare an Environmental Assessment and Operation and Maintenance Program associated with the operation and maintenance procedures along Western's transmission line ROWs between Sacramento (Sutter/Yuba County line) and the Oregon border. This project also includes a detailed survey of the biological and cultural resources along 434 miles of North Area ROW, 342 miles of COTP ROW, and several hundred miles of access and maintenance roads. Ms. Blair is working closely with project management and resource specialists to coordinate and execute over 800 miles of surveys. She conducted wildlife inventory and surveyed portions of ROW for sensitive species and recorded habitat types, jurisdictional waters and infrastructure using a Trimble GeoXT GPS unit. Additionally, Ms. Blair was integrally involved in the management and development of the North Area O&M GIS database.
- › **Categorical Exclusions for Routine Operation and Maintenance.** Under contract to Western, Ms. Blair has prepared multiple CXs for routine maintenance activities along Western's CVP, PACI, and COTP transmission line ROWs and access roads. She has developed a streamlined and highly efficient system to use the results and analysis for the North Area ROW Maintenance Project to complete these documents.
- › **GIS Data Verification and Resource Database Development for the Trinity County PUD Direct Interconnection Project.** Under contract to Western, Ms. Blair was the Deputy Project Manager for this project and also coordinated and conducted biological resources in support of the development of an O&M GIS database, which included identification of sensitive resources and associated project conservation measures for this new segment of Western's CVP transmission system.
- › **Seventh Standard Substation Project.** Under contract to the CPUC, Ms. Blair prepared the biological resource section of an Initial Study/Mitigated Negative Declaration for a proposed 4.9 acre 115/21 kV substation and transmission interconnection in northwest Bakersfield, Kern County, California. Important biological issues included impacts to the State and federally listed San Joaquin kit fox and western burrowing owl (a California species of special concern), as well as compliance with the Metropolitan Bakersfield Habitat Conservation Plan.
- › **Atlantic-Del Mar Reinforcement Project Mitigated Negative Declaration.** Under contract to the CPUC, Ms. Blair served as an assistant environmental monitor during the construction of four miles of overhead transmission towers and lines and approximately 1.3 miles of underground lines. The project involved trenching, horizontal drilling and blasting and requires avoidance of several wetlands, seasonal pools and threatened and endangered species.
- › **Miguel-Mission 230 kV #2 Project EIR Addendum.** Under contract to the CPUC, Ms. Blair helped to prepare a detailed addendum associated with engineering design changes for the Miguel-Mission 230 kV #2 Project.

#### Other Infrastructure, Resource Management, and Monitoring Projects

- › **Hazardous Fuels and Vegetation Management for Angeles National Forest.** Under contract to the U.S. Forest Service, Ms. Blair conducted botanical and wildlife surveys at approximately 100 sites ranging from one to 2500 acres throughout the Angeles National Forest. Modifications to current fuel management practices were proposed in response to increased frequency and intensity of wildfire resulting from climate change. She prepared 75 Biological Evaluations/Biological Assessments that assessed the biological impacts of proposed fuel management practices throughout the forest.

- › **Rare Plant Surveys for the East Branch Extension Pipeline Project.** Under contract to the Department of Water Resources, Ms. Blair conducted rare plant surveys of the endangered Santa Ana River wooly star (*Eriastrum densifolium* ssp. *sanctorum*) and the state and federally endangered slender horned spine flower (*Dodecahema leptoceras*) in response to the proposed construction of a water pipeline through San Bernardino and Riverside Counties.
- › **Upper San Antonio Creek Watershed Giant Reed Removal Project.** Ms. Blair prepared the biological resource analysis of an Initial Study to remove invasive plant species from the Upper San Antonio Creek Watershed. Required field survey and development of impact avoidance measures for several special-status species, including California red-legged frog, southern steelhead, and riparian nesting birds.
- › **Least Tern Monitoring for the Montezuma Slough Tidal Wetlands Restoration Project.** Under contract to EcoBridges Environmental, Ms. Blair monitored the nesting success of three nesting colonies of the federally and State endangered least tern. This effort involved counting and mapping the nest sites and tern chicks once a week for two years.
- › **Endangered Species Monitoring for the Lomita Canal Vegetation Clearing Project.** Monitored the federally threatened California Red-legged frog and the state- and federally endangered San Francisco Giant Garter Snake during vegetation clearing activities along the Lomita Canal at the San Francisco International Airport. Involved identification of these species, relocation of California red-legged frogs, and re-direction of work in the event a SF Garter Snake was spotted.

## PREVIOUS EXPERIENCE

### *Soil Ecology and Restoration Group*

*January to May 2004*

**Research Assistant.** Ms. Blair assisted in managing the greenhouse where native seeds were germinated and propagated. In this role, she collected seeds from native plants and analyzed the composition of the soil present in their native habitat to ensure seedling viability. The plants were subsequently used in the restoration of degraded habitat as contracted by the U.S. Army Corps of Engineers and others.

**DECLARATION OF  
Alvin J. Greenberg, Ph.D.**

I, **Alvin J. Greenberg, Ph. D.**, declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facility Siting and Environmental Protection Division.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the rebuttal testimony on **Hazardous Materials Management and Worker Safety/Fire Protection** for the **Abengoa Mojave Solar** project based on my independent analysis of the amendment petition, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 15, 2010

Signed: Original signed by A. Greenberg

At: Oakland, California

## **Risk Science Associates**

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047

415-479-7560 fax 415-479-7563

e-mail [agreenberg@risksci.com](mailto:agreenberg@risksci.com)

**Name & Title:**                      **Alvin J. Greenberg, Ph.D., FAIC, REA, QEP**  
**Principal Toxicologist**

Dr. Greenberg has had over two decades of complete technical and administrative responsibility as a team leader in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, the intrusion of subsurface contaminants into indoor air, and the preparation and review of public health/public safety sections of EIRs/EISs. Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the US EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee. Dr. Greenberg is the former Chair of the Bay Area Air Quality Management District Hearing Board, a former member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA. And, since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments, power plant security programs, and conducting safety and security audits of power plants for the California Energy Commission and has assisted the CEC in the assessment of safety and security issues for proposed LNG terminals. In addition to providing security expertise to the State of California, Dr. Greenberg was the Team Leader and main consultant to the State of Hawaii on the updating of their Energy Emergency Preparedness Plan.

**Years Experience:** 26

### **Education:**

B.S.                      1969    Chemistry, University of Illinois Urbana

Ph.D.                    1976    Pharmaceutical/Medicinal Chemistry, University of California,  
San Francisco

Postdoctoral Fellowship 1976-1979    Pharmacology/Toxicology, University of  
California, San Francisco

Postgraduate Training    1980    Inhalation Toxicology, Lovelace Inhalation  
Toxicology Research Institute, Albuquerque, NM



### **Professional Registrations:**

Board Certified as a Qualified Environmental Professional (QEP)  
California Registered Environmental Assessor - I (REA)  
Fellow of the American Institute of Chemists (FAIC)

### **Professional Affiliations:**

Society for Risk Analysis  
Air and Waste Management Association  
American Chemical Society  
American Association for the Advancement of Science  
National Fire Protection Association

### **Technical Boards and Committee Memberships - Present:**

Squaw Valley Technical Review Committee  
(appointed 1986)

### **Technical Boards and Committee Memberships - Past:**

July 1996 – March 2002

Member, Bay Area Air Quality Management District Hearing Board  
(Chairman 1999-2002)

September 2000 – February 2001

Member, State Water Resources Control Board Noncompliant Underground  
Tanks Advisory Group

January 1999 – June 2001

Member, California Air Resources Board Advisory Committee on Diesel  
Emissions

January 1994 - September 1999

Vice-Chairman, State Water Resources Control Board Bay Protection and Toxic  
Cleanup Program Advisory Committee

September 1998

Member, US EPA Workgroup on Cumulative Risk Assessment

April 1997 - September 1997

Member, Cal/EPA Private Site Manager Advisory Committee

January 1986 - July 1996

Member, Bay Area Air Quality Management District Advisory Council  
(Chairman 1995-96)

January 1988 - June 1995

Member: California Department of Toxic Substance Control Site Mitigation  
Program Advisory Group

January 1989 - February 1995

Member: Department of Toxics Substances Control Review Committee, Cal-EPA

October 1991 - February 1992

Chair: Pollution Prevention and Waste Management Planning Task Force of the Department of Toxics Substances Control Review Committee, Cal-EPA

September 1990 - February 1991

Member: California Integrated Waste Management Board Sludge Advisory Committee

September 1987 - September 1988

ABAG Advisory Committee on Regional Hazardous Waste Management Plan

March 1987 - September 1987

California Department of Health Services Advisory Committee on County and Regional Hazardous Waste Management Plans

January 1984 - October 1987

Member, San Francisco Hazardous Materials Advisory Committee

March 1984 - March 1987

Member, Lawrence Hall of Science Toxic Substances and Hazardous Materials Education Project Advisory Board

Jan. 1, 1986 - June 1, 1986

Member, Solid Waste Advisory Committee, Governor's Task Force on Hazardous Waste

Jan. 1, 1983 - June 30, 1985

Member, Contra Costa County Hazardous Waste Task Force

Sept. 1, 1982 - Feb. 1, 1983

Member, Scientific Panel to Address Public Health Concerns of Delta Water Supplies, California Department of Water Resources

### **Present Position**

January 1983- present

Owner and principal with Risk Sciences Associates, a Marin County, California, environmental consulting company specializing in multi-media human health and ecological risk assessment, air pathway analyses, hazardous materials management-infrastructure security, environmental site assessments, review and evaluation of EIRs/EISs, preparation of public health and safety sections of EIRs/EISs, and litigation support for toxic substance exposure cases.

### **Previous Positions**

Jan. 2, 1983 - June 12, 1984

Member, State of California Occupational Safety and Health Standards Board (Cal/OSHA), appointed by the Governor

Aug. 1, 1979 - Jan. 2, 1983

Assistant Deputy Chief for Health, California Occupational Safety and Health Administration

Feb. 1, 1979 - Aug. 1, 1979

Administrative Assistant to Chairperson of Finance Committee, Board of Supervisors, San Francisco

Jan. 1, 1976 - Feb. 1, 1979

Research Pharmacologist and Postdoctoral Fellow, Department of Pharmacology and Toxicology, School of Medicine, University of California, San Francisco

Jan. 1, 1975 - Dec. 31, 1975

Acting Assistant Professor, Department of Pharmaceutical Chemistry, University of California, San Francisco

## **Experience**

### **General**

Dr. Greenberg has been a consultant in Hazardous Materials Management and Security, Human and Ecological Risk Assessment, Occupational Health, Toxicology, Hazardous Waste Site Characterization, and Toxic Substances Control Policy for over 26 years. He has broad experience in the identification, evaluation and control of health and environmental hazards due to exposure to toxic substances. His experience includes Community Relations Support and Risk Communication through experience at high-profile sites and presentations at professional society meetings.

He has considerable experience in the review and evaluation of exposure via the air pathway - particularly to emissions from power plants, refineries, and diesel exhaust - and a thorough knowledge of the regulatory requirements through his experience at Cal/OSHA, the BAAQMD Hearing Board, as a consultant to the California Energy Commission, and in preparing such assessments for local government and industry. He has assessed exposures to diesel exhaust during construction and operations of stationary and mobile sources and has testified at evidentiary hearings numerous times on this subject.

He is presently assisting the California Energy Commission in assessing the risks to workers and the public of proposed power plants and LNG terminals in the state. His experience in hazard identification, exposure assessment, risk assessment, occupational safety and health, emergency response, and Critical Infrastructure Protection has made him a valuable part of the CEC team addressing this issue. He has reviewed and commented on the DEIS/DEIR for the proposed SES LNG Port of Long Beach terminal, focusing on security issues for the CEC and on safety matters for the City of Long Beach. He has presented technical information and analysis to the State of California Interagency LNG Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

He served for over five years as the Vice-chair of the California State Water Resources Control Board Advisory Committee convened to address toxic substances in sediments in bays, rivers, and estuaries. He has been a member of the Squaw Valley Technical Review Committee since 1986 establishing chemical application management plans at golf courses to protect surface and

groundwater quality. He has also conducted numerous ecological risk assessments and characterizations, including those for marine and terrestrial habitats.

Dr. Greenberg has extensive experience in data collection and preparation of human and ecological risk assessments on numerous military bases and industrial sites with Cal/EPA DTSC and RWQCB oversight. He has also been retained to provide technical services to the Cal/EPA Department of Toxic Substances Control (preparation of human health risk assessments) and the Office of Environmental Health Hazard Assessment (review and evaluation of air toxics health risk assessments and preparation of profiles describing the acute and chronic toxicity of toxic air contaminants). He has also conducted several surveys of sites containing significant lead contamination from various sources including lead-based paint, evaluated potential occupational exposure to lead dust and fumes in industrial settings, prepared numerous human health risk assessments of lead exposure, and prepared safety and health plans for remedial investigation of lead contaminated soils. Dr. Greenberg is also a recognized expert on the requirements of California's Proposition 65 and has served as an expert on Prop. 65 litigation.

### **Sites with EPA, RWQCB and/or DTSC Oversight**

Dr. Greenberg has specific experience in assessing human health and ecological risks at contaminated sites at the land/water interface, including petroleum contaminants, metals, mercury, and VOCs at several locations in California including Oxnard, Richmond, Avila Beach, Mare Island Naval Shipyard, San Diego, Hollister, San Francisco, Hayward, Richmond, the Port of San Francisco, and numerous other locations. He has used Cal/EPA methods, US EPA methods, and ASTM Risk Based Corrective Action (RBCA) and Cal/Tox methodologies. He is extremely knowledgeable about SWRCB and SF Bay RWQCB regulations on underground storage tank sites and with ecological issues presented by contaminated sediments including sediment analysis, toxicity testing, tissue analysis, and sediment quality objectives. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

Dr. Greenberg experience on many of these contaminated sites has been as a consultant to local governments, state agencies, and citizen groups. He assisted the City and County of San Francisco in developing local ordinance requiring soil testing (Article 20, Maher ordinance) and hazardous materials use reporting (Article 21, Walker ordinance). He served as the City of San Rafael's consultant to provide independent review and evaluation of the site characterization and remedial action plan prepared for a former coal gasification site. He was a consultant to a citizen group in northern California regarding exposure and risks due to accidental releases from a petroleum refinery and assisted in the assessment of risks due to crude petroleum contamination of a southern California beach. He has prepared a number of risk assessments addressing crude petroleum, diesel and gasoline contamination, including coordinating site investigations, environmental monitoring, and health risk assessment for the County of San Luis Obispo regarding Avila Beach subsurface petroleum contamination. That high-profile project lasted for over one year and Dr. Greenberg managed a team of experts with a budget of \$750,000. Another high-profile project included the preparation of an extensive comprehensive human and ecological risk assessment for the Hawaii Office of Space Industry on rocket launch impacts and transportation/storage of rocket fuels at the southern end of the Big Island of Hawaii. Dr. Greenberg's risk assessments were part of the EIS for the project. Dr. Greenberg also worked on another high-profile project conducting Air Pathway Analysis of off-site and on-site impacts

from landfill gas constituents, including indoor and outdoor air measurements, air dispersion modeling, flux chamber investigations, and health risk assessment for the County of Santa Barbara. Dr. Greenberg has conducted RI/FS work, prepared health risk assessments, evaluated hazardous waste sites and hazardous materials use at numerous locations in California, Hawaii, Oregon, Minnesota, Michigan, and New York. He has considerable experience in the development of clean-up standards and the development of quantitative risk assessments for site RI/FS work at CERCLA sites, as well as site closures, involving toxic substances and petroleum hydrocarbon wastes. He is experienced in working with both Region IX EPA and the State of California DTSC in negotiating clean-up standards based on the application of both site-specific and non site-specific health and ecological based clean-up criteria. He has significant experience in the development of site chemicals of concern list, quantitative data quality levels, site remedial design, the site closure process, the design and execution of data quality programs and verification of data quality prior to its use in the decision making process on large NPL sites.

### **Examples**

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment, Ecological Screening Evaluation, and Development of Proposed Remediation Goals for the Flair Custom Cleaners Site, Chico, California (January 1996)

Human Health Risk Assessment for the X-3 Extrudate Project at Criterion Catalyst, Pittsburg, Ca. (November 1994)

Screening Health Risk Assessment and Development of Proposed Soil Remediation Levels at Hercules Plant #3, Culver City, Ca. (July 1993)

Ecological Screening Evaluation for the Altamont Landfill, Alameda County, Ca. (June, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawaii (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawaii Office of Space Industry (March 1993)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Screening Health Risk Assessment for the Proposed Expansion of the West Marin Sanitary Landfill, Point Reyes Station, Ca. (March, 1993)

Health Risk Assessment for the Proposed Expansion of the Forward, Inc. Landfill, Stockton, Ca. (September 14, 1992)

Health Risk Assessment for the Rincon Point Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Health Risk Assessment for the South Beach Park Project, San Francisco, Ca. Prepared for Baseline Environmental Consulting and the San Francisco Redevelopment Agency. (August 10, 1992)

Screening Health Risk Assessment and Development of Proposed Soil and Groundwater Remediation Levels, Kaiser Sand and Gravel, Mountain View, Ca. Prepared for Baseline Environmental Consulting (January 30, 1992)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Preliminary Health Risk Assessment for the City of Pittsburg Redevelopment Agency, Pittsburg, California (May 29, 1991)

### **Military Bases**

Dr. Greenberg has experience in conducting assessments at DOD facilities, including RI/FS work, preparation of health risk assessments, evaluation of hazardous waste sites and hazardous materials use at the following Navy sites in California: San Diego Naval Base; Marine Corps Air-Ground Combat Center, 29 Palms; Mare Island Naval Shipyard, Vallejo; Treasure Island Naval Station, San Francisco, Hunters Point Naval Shipyard, San Francisco, and the Marine

Corps Logistics Base, Barstow. He worked with the U.S. Navy and the U.S. EPA in the implementation of Data Quality Objectives (DQO's) at MCLB, Barstow.

### **Examples**

Review and Evaluation of the Remedial Investigation Report and Human Health Risk Assessment for the U. S. Naval Station at Treasure Island, Ca. (June 1999)

Screening Health Risk Assessment for the Proposed San Francisco Police Department's Helicopter Landing Pad at Hunters Point Shipyard, San Francisco, Ca. (September 1997)

Development of Proposed Soil Remediation Levels for the Marine Corps Air-Ground Combat Center, 29 Palms, California (May 30, 1991)

Health Risk Assessment for the Chrome Plating Facility, Mare Island Naval Shipyard, Vallejo, California (October 24, 1988)

Background Levels and Health Risk Assessment of Trace Metals present at the Naval Petroleum Reserve No.1, 27R Waste Disposal Trench Area, Lost Hills, California (August 12, 1988)

RCRA Facility Investigation (RFI) Work Plan of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 14, 1989)

Hazardous Waste and Solid Waste Audit and Management Plan, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (July 3, 1989)

Water Quality Solid Waste Assessment Test (SWAT) Proposal RCRA Landfill, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (October 31, 1988)

Waste Disposal Facilities, Waste Haulers, Waste Recycling Facilities Report, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 22, 1988)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

Air Quality Solid Waste Assessment Test (SWAT) Proposal, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (August 25, 1988)

### **Liquefied Natural Gas (LNG)**

Dr. Greenberg assisted the CEC in the preparation of the "background" report on the risks and hazards of siting LNG terminals in California ("LNG in California: History, Risks, and Siting" July 2003) and consulted for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard. He has also conducted an evaluation and prepared comments on the risks, hazards, and safety analysis of the DEIS/DEIR for the City of Long

Beach on a proposed LNG terminal at the Port of Long Beach (POLB) and conducted an analysis on vulnerability and critical infrastructure security for the CEC on this same proposed LNG terminal. He currently advises the CEC on the POLB LNG proposal on risks, hazards, human thresholds of thermal exposure, vulnerability, security, and represented the CEC at a U.S. Coast Guard briefing on the Waterway Suitability Assessment that included the sharing of SSI (Sensitive Security Information). He has presented technical information and analysis to the State of California LNG Interagency Working Group on thermal radiation public exposure criteria and safety/security at an east coast urban LNG terminal. (Both presentations are confidential owing to the nature of the material.) He has conducted numerous evaluations of the safety and hazards of natural gas pipelines for the CEC and has presented his findings and recommendations at public meetings and evidentiary hearings.

### **Infrastructure Security**

Since 2002, Dr. Greenberg has been trained by and is working with the Israeli company SB Security, LTD, the most experienced and tested security planning and service company in the world. Since the events of 9/11, Dr. Greenberg has been the lead person for developing vulnerability assessments and power plant security programs for the California Energy Commission (CEC). In taking the lead for this state agency, Dr. Greenberg has interfaced with the California Terrorism Information Center (CATIC) and provided analysis, recommendations, and testimony at CEC evidentiary hearings regarding the security of power plants within the state. These analyses include the assessment of Critical Infrastructure Protection, threat assessments, criticality assessments, and the preparation of vulnerability assessments and off-site consequence analyses addressing the use, storage, and transportation of hazardous materials, recommendations for security to reduce the threat from foreign and domestic terrorist activities, perimeter security, site access by personnel and vendors, personnel background checks, management responsibilities for facility security, and employee training in security methods. Dr. Greenberg is the lead person in developing a model power plant security plan, vulnerability assessment matrix, and a security training manual for the CEC. The model security plan is used by power plants in California as guidance in developing and implementing security measures to reduce the vulnerability of California's energy infrastructure to terrorist attack. He has testified at several evidentiary hearings for the CEC on power plant security issues. He also leads an audit team conducting safety and security audits at power plants throughout California that are under the jurisdiction of the CEC. In addition to providing security expertise to the State of California, in August 2004, a team of experts led by Dr. Greenberg was awarded an 18-month contract by the State of Hawaii to update and improve the state's Energy Emergency Preparedness Plan and make recommendations for increased security of critical energy infrastructure on this isolated group of islands.

### **Air Pathway Analysis**

Dr. Greenberg has prepared numerous Air Pathway Analyses and human health risk assessments, evaluating exposure at numerous locations in California, Hawai'i, Oregon, Minnesota, Michigan, and New York. He is experienced in working with Region IX EPA, the State of California DTSC, and the Hawai'i Department of Health Clean Air Branch in the application of both site-specific and non site-specific health risk assessment criteria.



## **Examples**

Human Health Risk Assessment for the Open Burn/Open Detonation Operation at McCormick Selph, Inc., Hollister, Ca. (June 2003)

Air Quality and Human Health Risk Assessment for the Royal Oaks Industrial Complex, Monrovia, Ca. (January 2003)

Human Health Risk Assessment and Indoor Vapor Intrusion Assessment for the former Pt. St. George Fisheries Site, Santa Rosa, Ca. (October 2002)

Human Health Risk Assessment for the former Sargent Industries Site, Huntington Park, Ca. (July 2001)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Health Risk Assessment and Air Pathway Analysis for the Ballard Canyon Landfill, Santa Barbara County, Ca. (March 1999)

Human Health Risk Assessment, Teledyne Ryan Aeronautical, McCormick Selph Ordnance. Hollister, California. (December 1996)

Initial Phase Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (October 1996)

Human Health Risk Assessment for Current and Proposed Expanded Class II and Class III Operations at the Altamont Sanitary Landfill, Alameda County, Ca. (March, 1993)

Focused Ecological Risk Characterization, Hawaiian Electric Company, Keahole Generating Station Expansion, Hawai'i (June 1993)

Human Health Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (April 1993)

Ecological Risk Assessment for the Proposed Palima Point Space Launch Complex, prepared for the Hawai'i Office of Space Industry (March 1993)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

Cancer Risk Assessment for the H-Power Generating Station, Campbell Industrial Park, Oahu, Hawai'i (1988)

## **Hazardous Materials Assessments, Waste Management Assessments, Worker Safety and Fire Protection Assessments, and Public Health Impacts Assessments**

Dr. Greenberg also has significant experience as a consultant and expert witness for the California Energy Commission providing analysis, recommendations, and testimony in the areas of hazardous materials management, process safety management, waste management, worker safety and fire protection, and public health impacts for proposed power plant/cogeneration facilities. These analyses include the evaluation and/or preparation of the following:

- Off-site consequence analyses of the handling, use, storage, and transportation of hazardous materials,
- Risk Management Plans (required by the Cal-ARP) and Business Plans (required by H&S Code section 25503.5),
- Safety Management Plans (required by 8 CCR section 5189),
- Natural gas pipeline safety,
- Solid and hazardous waste management plans,
- Phase I and II Environmental Site Assessments,
- Construction and Operations Worker Safety and Health Programs,
- Fire Prevention Programs,
- Human health risk assessment from stack emissions and from diesel engines, and
- Mitigation measures to address PM exposure, including diesel particulates

### **Examples**

- Almond 2 Power Plant Project, City of Ceres, Ca. 2009 – present. Public health.
- Watson Cogeneration Steam and Electric Reliability Project, Carson, Ca. 2009 – present. Public health.
- Hanford Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Henrietta Combined-Cycle Power Plant (amendment), Kings County, Ca. 2008 – present. Public health.
- Lodi Energy Center, Lodi, Cal. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Marsh Landing Generating Station, City of Antioch, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.
- Palmdale Hybrid Power Plant, Palmdale, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- Stirling Energy Systems Solar 1 Project, San Bernardino County, Ca. 2008 – present. Public health.
- Stirling Energy Systems Solar 2 Project, Imperial County, Ca. 2008 – present. Public health.
- San Joaquin Solar 1&2, Fresno County, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- GWF Tracy Combined Cycle Power Plant, Tracy, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, public health.
- CPV Vaca Station Power Plant, Vacaville, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection.

- Willow Pass Generating Station, Pittsburg, Ca. 2008 – present. Hazardous materials management, worker safety/fire protection, waste management.
- Avenal Energy Power Plant, Avenal, Ca. 2008 – 2009. Worker safety/fire protection, public health.
- Orange Grove Energy, San Diego County, Ca. 2008-2009. Public health.
- Riverside Energy Resource Center Units 3&4, Riverside, Ca. 2008 – 2009. Hazardous materials management.
- Canyon Power Plant, Anaheim, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Carlsbad Energy Center, Carlsbad, Ca. 2007 – present. Hazardous materials management, worker safety/fire protection, public health.
- Ivanpah Solar Electric Generating System, San Bernardino County, Ca. 2007 – present. Public health.
- Kings River Conservation District Community Power Project, City of Parlier, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chula Vista Energy Upgrade Project, Chula Vista, Ca. 2007 – 2009. Hazardous materials management, worker safety/fire protection.
- Chevron Richmond Power Plant Replacement Project, Richmond, Ca. 2007 – 2008. Hazardous materials management, public health.
- Humboldt Bay Generating Station, Eureka, Ca. 2006 – 2008. Hazardous materials management, worker safety/fire protection, waste management.
- El Centro Power Plant – Unit 3 Repower Project, El Centro, Ca. 2006 – 2007. Public health.
- San Francisco Energy Reliability Project, San Francisco, Ca. 2004 – 2006. Hazardous materials management, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Malburg Generating Station Project, City of Vernon, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Blythe II, Blythe, Ca. 2002-3. hazardous materials, worker safety/fire protection,
- Palomar Energy Center, Escondido, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Project, Rancho Seco, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Project, Tesla, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management, public health
- San Joaquin Valley Energy Center, San Joaquin, Ca. 2002-3. hazardous materials, worker safety/fire protection, waste management
- Morro Bay Power Plant, Morro Bay, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Potrero Power Plant Unit 7, San Francisco, Ca., 2001-2: hazardous materials, worker safety/fire protection
- El Segundo Power Redevelopment Project, El Segundo, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Rio Linda Power Project, Rio Linda, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health

- Pastoria II Energy Facility Expansion, Grapevine, Ca., 2001: hazardous materials, worker safety/fire protection
- East Altamont Energy Center, Byron, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Magnolia Power Project, Burbank, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Russell City Energy Center, Hayward, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management
- Woodbridge Power Plant, Modesto, Ca., 2001: hazardous materials, worker safety/fire protection, waste management
- Colusa Power Plant Project, Colusa County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Valero Refinery Cogeneration Project, Benicia, Ca., 2001: hazardous materials, worker safety/fire protection
- Ocotillo Energy Project, Palm Springs, Ca., 2001: hazardous materials, worker safety/fire protection
- Gilroy Energy Center Phase II Project, Gilroy, Ca., 2001-2: hazardous materials, worker safety/fire protection
- Los Esteros Critical Energy Facility, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Roseville Energy Facility, Roseville, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Spartan Power, San Jose, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Inland Empire Energy Center, Romoland, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- South Star Cogeneration Project, Taft, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tesla Power Plant, Eastern Alameda County, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Tracy Peaker Project, Tracy, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Henrietta Peaker Project, Kings County, Ca., 2001: hazardous materials, worker safety/fire protection, waste management, public health
- Central Valley Energy Center, San Joaquin, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Cosumnes Power Plant, Rancho Seco, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Los Banos Voltage Support Facility, Western Merced County, Ca., 2001-2: waste management, public health
- Palomar Energy Project, Escondido, Ca., 2001-2: hazardous materials, worker safety/fire protection, waste management, public health
- Metcalf Energy Center, San Jose, Ca., 2000-1: hazardous materials
- Blythe Power Plant, Blythe, Ca., 2000-1: hazardous materials
- San Francisco Energy Co. Cogeneration Project, San Francisco, Ca., 1994-5: hazardous materials

- Campbell Soup Cogeneration Project, Sacramento, Ca., 1994: hazardous materials
- Proctor and Gamble Cogeneration Project, Sacramento, Ca., 1993-4: hazardous materials
- San Diego Gas and Electric South Bay Project, Chula Vista, Ca., 1993: hazardous materials
- SEPCO Project, Rio Linda, Ca., 1993: hazardous materials
- Shell Martinez Manufacturing Complex Cogeneration Project, Martinez, Ca., 1993: hazardous materials and review and evaluation of EIR

### **Occupational Safety and Health/Health and Safety Plans/Indoor Air Quality**

Dr. Greenberg has significant experience in occupational safety and health, having directed the development, adoption, and implementation of over 50 different Cal/OSHA regulations, including airborne contaminants (>450 substances), lead, asbestos, confined spaces, and worker-right-to-know (MSDSs). He has conducted numerous occupational health surveys and has extensive experience in the sampling and analysis of indoor air quality at residences, workplaces, and school classrooms. He is currently the team leader conducting safety and security audits at power plants throughout California for the California Energy Commission. Safety issues audited include compliance with regulations addressing several safety matters, including but not limited to, confined spaces, lockout/tagout, hazardous materials, and fire prevention/suppression equipment.

#### **Examples**

Review and Evaluation of Public and Worker Safety Issues at the proposed SES LNG Facility, Port of Long Beach. prepared for the City of Long Beach. (November 2005)

Confidential safety and security audit reports for 18 power plants in California. prepared for the California Energy Commission. (January 2005 through March 2006)

Report on the Accidental release and Worker Exposure to Anhydrous Ammonia at the BEP I Power Plant, Blythe, Ca. prepared for the California Energy Commission. (October 2004)

Investigation of a Worker Death in a Confined Space, La Paloma Power plant. prepared for the California Energy Commission. (July 2004)

Preliminary Report on Indoor Air Quality in Elementary School Portable Classrooms, Marin County, Ca. (December 1999)

Health Risk Assessment Due to Diesel Train Engine Emissions, Oakland, Ca. (June 1999)

Air Pathway Analysis for the Ballard Canyon Landfill. Submitted to the County of Santa Barbara, (March 1999)

Review and Evaluation of the Health Risk Assessment for Outdoor and Indoor Exposures at the Former Golden Eagle Refinery Site, Carson, Ca. (May 1998)

The Avila Beach Health Study Phase 1: Reconnaissance Sampling Findings, Conclusions, and Recommendations. (July 1997) Volume 1: Baseline Human Health Risk Assessment. (May 1998)

The Avila Beach Health Study Phase 1, Volume 2: Environmental Monitoring. (May 1998)

Phase 2 Human Health Risk Assessment, Teledyne Inc., San Diego, Ca. (February 1997)

Determination of Occupational Lead Exposure at a Tire Shop in Placerville, Ca. (April 1993)

Development of an Environmental Code of Regulations for Hazardous Waste Treatment Facilities on La Posta Indian Tribal lands, San Diego County, Ca. (August 1992)

Sampling and Analysis Plan, Health and Safety Plan, Site Characterization of Lead Oxide Contaminated Areas, Mare Island Naval Shipyard, Vallejo, California. Prepared in conjunction with Kaman Sciences Corp. (September 2, 1988)

### **Mercury Contamination**

Dr. Greenberg has prepared and/or reviewed several human health and ecological risk assessments regarding mercury contamination in soils, sediments, and indoor surfaces. Dr. Greenberg served on the State Water Resources Control Board Bay Protection and Toxic Cleanup Program Advisory Committee from 1994 until the end of the program in 1999.

### **Examples**

Review and evaluation of a human health risk assessment of ingestion of sport fish caught from San Diego Bay and which contain tissue levels of mercury and PCBs (November 2004 – present)

Screening Human Health Risk Assessment, Calculation of Soil Clean-up Levels, and Aquatic Ecological Screening Evaluation, Galilee Harbor, Sausalito, Ca. (May 1998)

Health Risk Assessment for Residual Mercury at the Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California. (July 1997)

Human Health Risk Assessment Due to Emissions from a Medical Waste Incinerator, prepared for Kauai Veterans Memorial Hospital, Kauai, Hawai'i (1994)

## DECLARATION OF SHAHAB KHOSHMAHRAB

I, **SHAHAB KHOSHMAHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Facilities Siting Division as a **MECHANICAL ENGINEER**.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in the preparation of the staff rebuttal testimony on **Noise and Vibration** for the **Abengoa Mojave Solar Project** based on my independent analysis of the Application for Certification, Transmission System Engineering Appendix A, and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010 Signed: Original signed by S. Khoshmashrab

At: Sacramento, California

**Shahab Khoshmashrab**  
Mechanical Engineer

**Experience Summary**

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

**Education**

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

**Professional Experience**

**2001-2004**--Mechanical Engineer, Systems Assessment and Facilities Siting-- California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

**1998-2001**--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

**1995-1998**--Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.



**DECLARATION OF  
Christopher B. Dennis, P.G.**

I, **Christopher B. Dennis**, declare as follows:

1. I am presently employed by the California Energy Commission for the in the Environmental Office of the Siting, Transmission and Environmental Protection Division as an Engineering Geologist.
2. My professional qualifications and experience are attached hereto and incorporated by reference herein.
3. I helped prepare the Staff Rebuttal Testimony on **Soil and Water Resources** for the Abengoa Mojave Solar project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010 Signed: Original signed by C. Dennis

At: Sacramento, California

## **CHRISTOPHER B. DENNIS, P.G., J.D.**

### **EXPERIENCE SUMMARY**

Mr. Dennis is a licensed Professional Geologist with the State of California. His professional experience includes over 17 years of innovative technical and management experience. He has worked with a wide variety of CEQA and environmental management issues including soil, water, and waste compliance, investigation, and remediation. He has recently worked with siting and compliance of natural gas-fired and solar power plants. He has been a portfolio manager for several major oil companies and the East Bay Municipal Utility District's trench spoils program. He actively managed Unocal CERT, ExxonMobil, and ChevronTexaco pipeline, service station, bulk fueling, and terminal sites. He is knowledgeable of California's regulatory structure and laws, and is proficient in CEQA analysis, risk assessment, site assessment, remediation, environmental due diligence, and database/GIS development and management.

### **EDUCATION/REGISTRATION/CERTIFICATIONS**

Pepperdine Law School, Certificate in Dispute Resolution, 1997

Whittier College of Law, J.D., 1996

California State University, Fullerton, B.S. Geology, 1989

Licensed Professional Geologist, State of California #7184

OSHA-SARA 40-Hour Hazardous Waste Activity Training 29 CFR 1910.120

### **PROFESSIONAL HISTORY**

2007 to Current California Energy Commission, Engineering Geologist

2004 to 2007 Science Applications International Corporation, Senior Geologist

2004 to 2004 Bay Consulting Services, LLC, Principal

2001 to 2004 Cambria Environmental Technology, Inc., Senior Geologist

2000 to 2001 Alisto Engineering, Inc, Senior Geologist

1998 to 2000 TRC, Inc., Senior Geologist

1993 to 1995 GeoResearch, Inc., Project Manager

1990 to 1993 AeroVironment, Inc., Staff Geologist

1989 to 1990 Applied Geosciences, Inc., Technician

2007 to Current California Energy Commission, Sacramento, CA

Siting, Transmission, and Environmental Protection Division. Focusing on siting and compliance for simple-cycle, combined cycle, solar, and hybrid power plants. Developed a broad knowledge of CEQA impact analysis and mitigation involving water resources, water quality, soil resources, and waste management. Developed preliminary and final staff assessments involving issues of basin water management, overdraft, water quality, water conservation, water transfers, flood potential, and wind and water soil erosion. Deeply involved in issues surrounding the recently proposed large-scale solar power projects including project grading designs, flood management, water use, biological resource impacts, interagency cooperation, and laws, ordinances, regulations, and standards compliance. Also participating in the Quarterly Fuels and Energy Reporting (QFER) program and Environmental Policy Report. Oversaw the development of a QFER database for the collection and management of water use and wastewater discharge by all power plants 20 MW and greater in California.

2004 to 2007 Science Applications International Corporation, Sacramento, CA

Chevron, Northern California (various sites). Managed several former pipeline right-of-way and pump stations sites within the Central California region. Developed and implemented new written field quality assurance/quality control procedures for the entire portfolio of sites. Developed and implemented an analytical laboratory evaluation plan. Managed the groundwater monitoring and sampling program for the portfolio. Initiated low-flow sampling and the use of pre-packed filter screens in boreholes to reduce turbidity in groundwater samples and attain low risk-assessment level detection limits. Initiated a crude oil remediation study for the portfolio that is proving to be a pivotal tool for closure of the pipeline sites. Submitted the first soil vapor survey workplan to the RWQCB for the portfolio and was given approval of that workplan without comment. Worked with a GIS team to incorporate all pertinent site data into a web-based GIS and geo-reference the GIS as appropriate. This portfolio required a significant amount of for-end planning and coordination. Developed and managed all sites budgets and billing.

2004 to 2004 Bay Consulting Services, LLC, Rocklin, CA

Chevron, Northern California (various sites). Completed several closure requests with Tier I/II risk analysis. Started and operated this experimental company for two months.

2001 to 2004 Cambria Environmental Technology, San Ramon and Rocklin, CA

Chevron, Northern California (various sites). Responsible for a large portfolio (40 - 60+ active sites) of ChevronTexaco service station, bulk fueling, and terminal sites in Northern California, some of which were located in the sensitive Lake Tahoe area. Started Cambria's Rocklin office and grew that office to a staff of over 12 in less than a year through initiative and hard work. Helped develop and received State Underground Storage Tank (UST) Fund pre-approved for ~100 low-risk ChevronTexaco sites as part of a management transfer initiative. Through good regulatory communication, solid analysis, and hard work, closed over 30 sites in two years (half of one portfolio). Site closures were risk-based using both natural attenuation and active remediation approaches. Worked with Caltrans on a freeway (CA I-80) expansion project that required excavation and dewatering beneath a former Chevron site. Through a series of constructive meetings, built into the Caltrans request for bid, specifications for handling petroleum impacted excavated soils and water. The expansion project has proceeded as expected and planned. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

East Bay Municipal Utility District, Northern California (various sites). Brought to Cambria a three-year, \$275K/yr maximum EBMUD contract. The contract focused on pre-trenching activity soil sampling/analysis for potential contaminant identification and on trench spoils sampling/analyses for soil disposal. Developed a small group of professionals to manage this portfolio. As part of this project, managed several EPA SW-846 statistical soil analysis projects at District landfill sites with volumes up to ~180,000 cubic yards of landfilled soil. Created and surveyed statistical grids on the landfills and characterized the soil for removal to Class III or Class II landfills. Conducted site investigations and quarterly groundwater monitoring projects. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

2000 - 2001 Alisto Engineering, Lafayette, CA

Caltrans, Northern California (various sites). Conducted statistical analyses of the soil from the shoulders of several Caltrans highways in Southern California. Performed the statistical

analyses to determine lead hazard levels for use soil management planning in proposed construction corridors. The statistical analyses were performed on sample populations ranging from approximately 80 to 300. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Industrial Facilities, Northern California (various sites). Conducted site investigations at several industrial sites in Northern California. Developed storm water pollution prevention plans (SWPPPs) for development projects in downtown San Jose and a Caltrans project along CA I-680. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

1998 - 2000 TRC, Concord, CA

ExxonMobil, Northern California (various sites). Responsible for a mid-size portfolio (15 - 20+ active sites) of ExxonMobil service station and bulk fueling sites in Northern California. Through good regulatory communication, solid analysis, and hard work, closed over 30 sites. Site closures were risk-based using both natural attenuation and active remediation approaches. For one bulk plant on the sensitive Napa River, secured a public recession of a RWQCB cleanup and abatement order and site closure for Mobil after two years of negotiations, technical presentations, and meetings. Conducted high vacuum, dual-phase extraction at several ExxonMobil sites. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Quick Stop Markets, Northern California (various sites). Developed and managed a small portfolio of Quick Stop Market sites in Northern California. Saved the client thousands of dollars in lease fees by closing a site through solid regulatory negotiation and communication, and aggressive site assessment and remediation. The site was located a few blocks upgradient from Lake Merritt in Oakland. Conducted high vacuum, dual-phase extraction at several Quick Stop sites. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

Miscellaneous Sites, Northern California. Team member of the Level 3 Communications environmental impact report (EIR) submittals, preparing geologic hazard evaluations. Conducted site investigations at several industrial sites in Northern California. Liaison for the client and regulators. Developed and managed all sites budgets and billing.

1993 - 1995 Project Manager, GeoResearch, Long Beach, CA

Unocal CERT, Southern California (various sites). Project manager of a portfolio of active Unocal CERT sites. Frequently utilized mobile laboratories to assist in the placement of soil borings, vapor extraction, and groundwater wells. Conducted risk assessments, site assessments, tanks pulls, station demolitions, aquifer and vapor extraction tests, and remediation system designs and installations.

1990 - 1993 Staff Geologist, AeroVironment, Monrovia, CA

Project manager and project geologist for industrial sites and government projects. Team leader for documenting homestead well locations and archaeological and biological concerns at over 400 former homestead sites at Edwards AFB using GPS technology. Conducted groundwater sampling according to AFCEE protocols, and soil-vapor and geophysical surveys at Vandenberg AFB. Member of the design team of a mobile soil-vapor laboratory. Lead designer of an insitu soil-vapor sample collection system. Managed two teams for monitoring landfill vapor emissions and subsurface migration at active county operated landfills, and wrote the standard operating procedures, conducted field training, and prepared quarterly AQMD reports.

**DECLARATION OF  
John L. Fio**

I, John L. Fio, declare as follows:

1. I am presently a consultant to the California Energy Commission for the Siting Office of the Energy Facilities Siting Division as a Hydrogeologic Consultant through Aspen Environmental Group.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff rebuttal testimony on **Soil and Water Resources** for the Abengoa Mojave Solar project based on my independent analysis of the Application for Certification and the supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010 Signed: Original signed by J. Fio

At: Davis, California

# JOHN L. FIO

## **QUALIFICATIONS**

John L. Fio has over 25 years of problem-solving experience. Mr. Fio analyzes groundwater systems, quantifies chemical transport in the subsurface, and evaluates groundwater surface-water interactions. He is a recognized expert on hydrologic and water quality issues in the San Francisco Bay Area and the San Joaquin Valley, California.

John Fio:

- Develops and employs numerical models for site, water district, and basin-wide investigations.
- Calculates extraction effects on groundwater levels, stream flow, and lake levels.
- Establishes water quality monitoring programs.
- Designs water management plans.
- Evaluates groundwater quality effects of wastewater and recycled water disposal to land.
- Develops and implements Geographic Information System (GIS) databases.
- Determines water sources using chemical and age-dating techniques.

## **PROFESSIONAL EXPERIENCE**

*January, 1998 – present*

Principal Hydrologist, HydroFocus, Inc.

*Davis, CA*

- Technical Groundwater Expert, Bureau of Water and Power, City of Beijing, China. Providing review, oversight, and direction for data collection, data interpretation, and groundwater-flow and constituent transport modeling of recycled water groundwater storage project.
- Water supply master plan, California Water Service Company, South San Francisco, California. Assessed water supply and quality benefits of alternative water supply projects in the Westside Groundwater Basin.
- Data and modeling analysis of regional drainage conditions – San Joaquin Valley, California.
- Groundwater-flow, solute-transport, and water-quality impacts from wastewater disposal to land: sanitary districts and municipalities located in San Joaquin and Contra Costa Counties, California.
- Groundwater quality, sea water intrusion and groundwater flow in San Francisco and San Mateo Counties, California. Field data collection, groundwater-flow and geochemical modeling to define seawater intrusion and quantify processes affecting groundwater quality.
- Groundwater extraction to control and remediate solvent plume – San Mateo County. Use of groundwater-flow model and field data collection and analysis to quantify contaminant movement and remediation.

- Quantitative hydrogeochemical assessment of contaminant transport near Menlo Park, California. Development of groundwater-flow and solute-transport models to quantify hydrocarbon transport beneath industrial facility near San Francisco Bay.
- Groundwater recharge and subsurface storage, Merced County, California. Developed and implemented regional groundwater-flow model to assess groundwater recharge and pumping projects.
- Depletion of subsurface flow to the North Platte River, Wyoming and Nebraska. Data analysis and modeling of stream aquifer interactions in support of interstate water rights conflict.
- Hydrologic and geochemical impacts of groundwater pumping and surface water injection– Sacramento County.

*1995 to 1997*

Senior Project Hydrologist, Hydrologic Consultants, Inc.      *Sacramento, CA*

Project experience in the evaluation of groundwater flow, water quality, and solute transport. Consulting assignments included the following:

- Developed relationships to describe geologic controls and load-flow relationships for Santa Ynez River drainage system. The Santa Ynez River is a significant source of water recharging the Lompoc Groundwater Basin, and the relationships were part of a network of interacting reservoir operations, surface-water, and groundwater-flow and transport models.
- Evaluation of groundwater-flow paths beneath South San Francisco Bay. The groundwater-flow system was quantified using a groundwater-flow model to assess system response to pumping centers located east and west of the Bay.
- Coordination with the California Regional Water Quality Control Board on the remediation of a VOC plume in Mountain View, California.
- Assess the response of groundwater levels, streamflow, and spring discharge to groundwater pumpage in the Mammoth Basin, California.
- Quantifying stream flow depletions owing to increased consumption and groundwater pumping.

*1990 to 1995*

Research Grade Hydraulic Engineer, U.S. Geological Survey      *Sacramento, CA*

- Conducted regional and geohydrologic and groundwater quality investigations in the western San Joaquin Valley, California.
- Directed the development of a regional Geographic Information System database for the South San Francisco and Peninsula Area, California.
- Supervised data collection and development of databases, data analyses, and report writing.
- Constructed groundwater flow models for parts of the western San Joaquin Valley and South San Francisco Bay areas, California.
- Interacted with private and public cooperators and funding agencies.

*1987 to 1990*

Civil Engineer, U.S. Geological Survey

*Sacramento, CA*

- Conducted field-scale investigations of on-farm drainage systems.
- Developed groundwater-flow model of tile drainage system. Assessed flow paths and salt transport in shallow flow-system. Quantified regional groundwater-flow paths intercepted by on-farm drainage systems.
- Integrated particle-tracking models with groundwater-flow model results to assess advective transport of salts and selenium.

*1985 to 1987*

Hydrologist, U.S. Geological Survey

*Sacramento, CA*

- Designed and conducted sorption experiments and incorporated results into a solute transport model.
- Assessed the distribution of salts and selenium in unsaturated and saturated soil profiles.
- Developed analytical method to estimate organic selenium concentrations in soil extracts.

*1983 to 1984*

Research Assistant, University of California

*Davis, CA*

- Conducted an assessment of methods used to analyze for selenium in soil extracts, aqueous samples, and animal tissues.
- Implemented experiments to assess arsenic volatilization from soils.
- Conducted laboratory analyses to estimate the buffering capacity of soils in response to acidic deposition.

### **ACADEMIC BACKGROUND**

Master of Science, 1987, Civil Engineering, University of California at Davis  
Bachelor of Science, 1984, Soil and Water Science, University of California at Davis

### **PROFESSIONAL AFFILIATIONS**

American Society of Civil Engineers  
Association of Groundwater Scientists and Engineers  
California Groundwater Resources Association



## AWARDS AND HONORS

U.S. Geological Survey Performance Award: 1989, 1990, 1992, 1993, and 1994  
Citation for Outstanding Performance, University of California, Davis (1981)  
Edward Kraft Scholarship Prize, University of California, Davis (1981)

## RELEVANT PUBLICATIONS

### *Hydrogeology of the San Francisco Bay Area*

Metzger, L.F. and **Fio, John L.**, 1997, Ground-water development and the effects on ground-water levels and water quality in the Town of Atherton, San Mateo County, California, U.S. Geological Survey Water-Resources Investigations Report 97-4033, 31p.

**Fio, John L.**, and Leighton, D.A., 1995, Geohydrologic framework, Historical Development of the ground-water system, and general hydrologic and water-quality conditions in 1990, south San Francisco Bay and Peninsula area, California: U.S. Geologic Survey Open-File Report 94-357, 46 p.

Leighton, D.A., **Fio, John L.**, and Metzger, L.F., 1995, Database of well and areal data, South San Francisco Bay and Peninsula area, California: U.S. Geological Survey Water-Resources Investigation Report 94-4151, 47 p.

### *Geochemistry and Salt Migration*

**Fio, John L.**, Fujii, R. and Deverel, S.J., 1991, Selenium mobility and distribution in irrigated and nonirrigated alluvial soils: Soil Science Society of America Journal, v. 55, p. 1313-1320.

Deverel, S.J., and **Fio, John L.**, 1991, Ground-water Flow and solute movement to drain laterals, western San Joaquin Valley, California. 1: Geochemical Assessment, Water Resources Research, v. 27, no. 9, 2233-2246 p.

**Fio, John L.**, and Fujii, R., 1990, Selenium speciation methods and application to soil saturation extracts from San Joaquin Valley, California: Soil Science Society of America Journal, v. 54, p. 363-369.

Fujii, R. and **Fio, John L.**, 1988, Partitioning and speciation of soluble and adsorbed selenium in soils: Agronomy Abstracts, Amer. Soc. Agron. Annual meetings, Anaheim, California, p. 196-97.

*Numerical Modeling – Groundwater flow and contaminant transport*

**Fio, John L.**, 1997, Geohydrologic effects on drainwater quality: Journal of Irrigation and Drainage Engineering, ASCE 123(3).

**Fio, John L.**, and Leighton, D.A., 1994, Effects of ground-water chemistry and flow on quality of drainflow in the western San Joaquin Valley, California: U.S. Geological Survey Open-File Report 94-72, 28 p.

**Fio, John L.**, 1994 Calculation of a water budget and delineation of contributing sources to drain flows in the western San Joaquin Valley, California: U.S. Geological Survey Open-File Report 94-45, 28 p.

Barlow, Paul M., Wagner, B.J., Belitz, K., and **Fio, John L.**, 1993, Effects of Management alternatives on the shallow, saline ground water in the western San Joaquin Valley, California, Water Fact Sheet, Open-File Report 93-665.

**Fio, John L.**, and Deverel, S.J., 1991, Ground-water flow and solute movement to drain laterals, western San Joaquin Valley, California. 2: Quantitative hydrologic assessment. Water Resources Research, v. 27, no. 9, 2247-2257 p.

**Fio, John L.**, and Deverel, S.J., 1990, Interaction of shallow ground water and subsurface drains: implications for selenium transport and distribution in the western San Joaquin Valley, California. Abstract for technical session on ground-water flow systems and land use: relation to quality of shallow ground water, Association of Ground Water Scientists and Engineers, Anaheim, California, in Journal of Ground Water, v. 28, no. 5, p. 788-789.

**Fio, John L.**, and Deverel, S.J., 1989, Ground-water flow to subsurface drains in the western San Joaquin Valley, California: U.S. Geological Survey Second National Symposium on Water Quality, Orlando, Florida, November 12-17, 1989, abstracts and technical sessions, U.S. Geological Survey Open-File Report 89-409, p. 25.

**Fio, John L.**, and Deverel, S.J., 1988, Ground-water flow to subsurface agricultural drains in the western San Joaquin Valley, California: Transactions of the American Geophysical Union, v. 69, no. 44.

*Monitoring*

Leighton, D.A. and **Fio, John L.**, 1995, Evaluation of a monitoring program for assessing the effects of management practices on the quantity and quality of drainwater from the Panoche Water District, Western San Joaquin Valley, California, U.S. Geological Survey Open-File Report 95-731, 25 p.

Puckett, L.K., Alemi, M.M., Fan, A.M., **Fio, John L.**, Hansen, D., Wallender, and W., Wernette, F., 1992, Long-term monitoring plan, San Joaquin Valley Drainage Implementation Program.

**DECLARATION OF  
Eugene B. (Gus) Yates**

I, Gus Yates, declare as follows:

1. I am presently a consultant to the California Energy Commission for the Siting Office of the Energy Facilities Siting Division as a Hydrogeologic Consultant through Aspen Environmental Group.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff rebuttal testimony on **Soil and Water Resources** for the Abengoa Mojave Solar project based on my independent analysis of the Application for Certification and the supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010 Signed: Original signed by E. Yates

At: Davis, California

# EUGENE B. (GUS) YATES

## QUALIFICATIONS

Gus Yates has been a professional hydrologist in California for over 25 years. His role in water resources management projects commonly bridges the technical and policy realms. He specializes in rapidly identifying the key water-related issues for a project and addressing them with appropriate quantitative tools that make the best use of available data. He ties his technical work back into management plans and regulatory compliance documents. He has extensive experience in analysis and management of groundwater basins and related surface water and habitat systems throughout central and northern California. Mr. Yates is registered with the State of California as a professional geologist and certified hydrogeologist.

## PROFESSIONAL EXPERIENCE

*April, 2009 – present*

Senior Hydrologist, HydroFocus Inc.

*Davis, CA*

Evaluates groundwater conditions at local and basinwide scales using modeling and statistical techniques; leads stakeholder processes to develop groundwater and watershed management plans that are grounded in technical understanding of the hydrologic system; applies operations models to optimize project design and quantify environmental impacts; applies training and experience in CEQA, NEPA, water-quality regulations, water rights, group facilitation, and litigation.

*January, 1999 - March, 2009*

Consulting Hydrologist in Private Practice

*Berkeley, CA*

- Groundwater flow and transport model, San Benito County, CA – Developed a regional groundwater flow and salinity model with MODFLOW and MT3DMS.
- Groundwater flow model, Laguna Seca subarea, Monterey County, CA – Developed and jointly calibrated a soil-moisture-recharge model and groundwater flow model to evaluate safe yield in a small, structurally complex coastal basin.
- Southeast Chico drainage study – Applied MODFLOW and HEC-RAS models to determine the cause of periodic shallow flooding in a new suburb.
- Groundwater flow model, Yuba goldfields wet-pit gravel quarry, Yuba County, CA – Developed a local-scale MODFLOW model to estimate the impacts of a proposed gravel quarry that would penetrate a regional confining layer.
- Seaside Basin update on groundwater conditions, Seaside, CA – Updated and improved prior estimates of pumping, recharge, aquifer characteristics and yield to help resolve a water-rights dispute.
- Cambria Community Services District water-supply master plan – Quantified the frequency and duration of drought-related water shortages and evaluated feasibility of water supply alternatives.
- Fish habitat improvements, Yolo Bypass, CA -- Applied HEC-RAS stream hydraulics model with input from landowners and biologist to design creek modifications that would improve anadromous fish passage and create localized inundation for splittail spawning and rearing.

- Integrated water resources management plan, Yolo County, CA -- Provided technical expertise and local knowledge as coauthor of a countywide water management with state and local agencies.
- Groundwater management plan, Soquel Creek Water District, Santa Cruz County, CA -- Served as technical advisor and coauthor for GMP update to meet SB1938 requirements and focus monitoring and management actions on emerging key issues.

1991-1999

Environmental Scientist, Jones & Stokes Associates

*Sacramento, CA*

- Willow Slough watershed management plan, Yolo County, CA – Facilitated stakeholder process; documented groundwater, flooding and habitat conditions; and developed BMPs for agriculture.
- Groundwater management plan, northern San Benito County, CA – Served as facilitator, technical advisor and author for a multi-party planning process to identify issues and realistic solutions in a heavily-used groundwater basin.
- Subsidence impacts of groundwater pumping, Mendota, CA – Developed regression equations based on extensive USGS data to predict subsidence from groundwater transfers.
- Nitrate contamination from septic systems, Los Osos, CA – Served as expert advisor for field investigation of nitrate contamination from septic systems in a sandy coastal aquifer.
- Operations model for conjunctive use of desal plant and groundwater, Cambria, CA – Developed a probabilistic, real-time operations model to guide the conjunctive use of a desalination plant with existing water-supply wells.
- Instream flow litigation, Putah Creek, Yolo and Solano Counties, CA – Expert witness in a trial challenging the adequacy of instream flows below Monticello Dam.

1982-1990

Hydrologist, U.S. Geological Survey

*Sacramento, CA*

- Groundwater model of Salinas Valley groundwater basin, Monterey County, CA – Developed one of the earliest models of the Salinas Valley groundwater basin and applied optimization theory to conjunctive use operations.
- Groundwater flow model, Los Osos, CA – Created a groundwater flow model to evaluate 3-D interactions of Los Osos Creek, the Pacific Ocean and groundwater flow in a layered coastal groundwater basin. Subsequently added solute transport module to estimate long-term nitrate impacts of a wastewater project.
- Groundwater flow and quality, Santa Rosa and San Simeon Creek basins, Cambria, CA – Managed a comprehensive investigation of groundwater conditions in two coastal stream valleys, and developed finite-element models to integrate data and explore management options.

## **ACADEMIC BACKGROUND**

Master of Science, 1985, Water Science, University of California at Davis  
 Bachelor of Arts, 1979, Geology, Harvard University, Cambridge, MA

## **PROFESSIONAL AFFILIATIONS**

American Institute of Hydrology – certified professional hydrogeologist  
Groundwater Resources Association of California

**DECLARATION OF  
Mike Conway**

I, Mike Conway, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as an Engineering Geologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff rebuttal testimony on the **Soil and Water Resources** for the **Abengoa Mojave Solar** project (09-AFC-5) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010

Signed: Original signed by M. Conway

At: Sacramento, California

## Resume For: Mike Conway

**Education:** Bachelor of Science in Geology, University of California, Davis, August 2003.  
Master of Science in Geology, California State University, Sacramento, expected 2011

**Certifications:** Certified Professional in Erosion and Sediment Control (CPESC)  
Certified Erosion, Sediment and Storm Water Inspector (CESSWI)  
Leadership in Energy and Environmental Design Accredited Professional (LEED AP)

### Experience:

***Engineering Geologist: California Energy Commission, Sacramento, CA*** **2009**

- Conduct analyses of soil and water resource reports submitted to Commission
- Assess impacts to soil and water resources from construction and operation of energy producing facilities
- Perform onsite evaluations of soil and water resources pre and post-project
- Implement a CEQA-like review of proposed energy projects to evaluate environmental impacts

***Environmental Scientist: Central Valley Water Board, Rancho Cordova, CA*** **2009**

- Wrote municipal storm water permits for Phase I communities in the Central Valley
- Reviewed storm water annual reports for Phase I and II municipalities
- Conducted audits of industrial sites for compliance with storm water permits
- Conducted audits of municipalities for compliance with municipal permits
- Help communities better understand how to effectively implement storm water programs
- Represented Water Board in large technical workshops and other public forums

***Environmental Consultant: Wood Rodgers, Inc., Sacramento, CA*** **2006-2009**

- Consulted clients on how to comply with Federal, State and local storm water quality and environmental regulations
- Helped public and private sector clients gain State Water Resources Control Board (SWRCB) permit coverage under Large and Small MS4 General Permits, NPDES Permits, CWA Section 401 Permits
- Consulted clients on Army Corps of Engineers, 404 Permitting
- Developed a storm water quality manual for Yolo County
- Prepared Caltrans environmental documentation and design for all project phases
- Prepared Storm Water Management Plans (SWMP) and Storm Water Pollution Prevention Plans (SWPPP)
- Drafted water pollution control exhibits using both AutoCAD and MicroStation
- Prepared Caltrans Storm Water Data Reports including cost estimates
- Designed landscaping plans for Caltrans' Modesto Ramp Rehabilitation Project
- Prepared Spill Prevention Control and Countermeasure (SPCC) plans
- Created Hazardous Materials Business Plan for City of Fort Bragg, California
- Prepared proposals for outgoing environmental quality project bids
- Performed field visits to evaluate Best Management Practice (BMP) effectiveness in reducing erosion and sedimentation
- Facilitated multiple storm water quality training workshops for groups up to 20 plus

***Storm Water Quality Consultant: EnviroSafety Services, Elk Grove, CA*** **2004-2006**

- Wrote site specific SWPPPs to include guidance specific to city, county, and geographical constraints
- Designed BMP exhibits using AutoCAD
- Conducted inspections at construction sites throughout the Central Valley for (SWPPP) compliance
- Resolved storm water compliance issues in cooperation with site superintendents, county and city inspectors
- Researched current storm water protection regulations to best protect clients

***Post-Graduate Researcher: Dept. of Land, Air, and Water Resources, U.C. Davis, CA*** **2003**

- Studied the effects of irrigation practices on wetland ecology and water quality
- Independently organized monthly analyses and data processing of selenium contaminated invertebrate, algae, and water samples from the Tulare Lake Drainage District
- Managed concentrated acids, carcinogenic solutions, and final fluorescence measurements
- Compiled research data and presented findings to a team of eight colleagues

***Lab Technician: Raney Geotechnical Laboratory, West Sacramento, CA*** **2001**

- Conducted moisture density, unconfined compression tests, Atterburg Limit, curve, plasticity tests, and basic calculations for soil samples
- Administered load tests on concrete cylinders and mortar samples
- Performed percolation tests and Dynamic Cone Penetrator (DCP) tests in the field and gathered water samples for environmental analysis



**DECLARATION OF  
Steven J Brown, PE**

I, Steven J Brown, declare as follows:

1. I have been retained as a consultant to the California Energy Commission for my professional specialty of transportation.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff testimony of the **Traffic & Transportation Section**, which includes the Supplemental Staff Assessment, Appendix A, and Response to Comments regarding the **Abengoa Mojave Solar** project (09-AFC-5) based on my independent analysis of the Application for Certification and supplements, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 6/23/10

Signed: 

At: Santa Monica, CA

# STEVEN J. BROWN, PE

Senior Principal



Mr. Brown is a Senior Principal with 22 years of experience in transportation planning and engineering. In addition to his 15 years of consulting experience, Mr. Brown was the Director of Transportation Planning for the City of Sacramento. He has managed projects in 8 states that include the following disciplines: transportation master plans, traffic calming, environmental impact assessments, parking and circulation studies, bicycle and pedestrian facility plans, new-urbanist planning, freeway interchanges, intersection/signal designs and corridor studies. Mr. Brown earned a Master's Degree in Transportation from the University of California, Berkeley, and a Master's in Business Administration from Golden Gate University in San Francisco. He is a registered traffic engineer in California.

## EDUCATION

Bachelor of Science in Civil Engineering with Honors, University of California, Berkeley, 1985  
Master of Science in Transportation, University of California at Berkeley, 1987  
Masters in Business Administration, Golden Gate University, 1998

## PROFESSIONAL AFFILIATIONS

Institute of Transportation Engineers (ITE): Member, Northern California Section President 2000-2001,  
Co-chair ITE District 6 Conference, 2004

## PROFESSIONAL REGISTRATION

Licensed Traffic Engineer, State of California (TR1510)

## AREAS OF EXPERTISE

Traffic Engineering •

## PUBLICATIONS

*US Traffic Calming Manual*, co-authored with Reid Ewing, APA & ASCE, 2009  
*Skinny Streets*, co-authored with Reid Ewing, ULI July 2007  
*Traffic Calming Revisited*, co-authored with Reid Ewing and Aaron Hoyt, ITE Journal November 2005  
*Traffic Calming Revisited*, TRB Conference, 2004  
*Community Based Street Design Standards*, co-authored with Gwen Owens, ITE District 6 Conference, 1998  
*Measurable Traffic Calming Results*, co-authored with Martin Hanneman & Ken Grehm, ITE District 6 Annual Conference, 1999  
*Calming the Community (Traffic Calming in Downtown Sacramento)*, co-authored with Steve Fitzsimons, ITE National and District 6 Conference, 1997  
*Traffic-Generation Characteristics of Distribution Centers*, co-authored with Alan Telford, ITE District 6 Conference, 1990  
*The Single-Signal Interchange*, co-authored with Gerald Walters, ITE National Conference, 1988

## CEC PROJECTS

Moss Landing  
Sterling Solar 2  
Abengoa Mojave  
Morro Bay

**DECLARATION OF  
Thomas Packard**

I, Thomas Packard, declare as follows:

1. I am presently under contract with William Kanemoto to provide environmental technical assistance to Aspen Environmental Group and the California Energy Commission. I am serving as a Visual Resource Specialist to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I prepared the staff rebuttal testimony on **Visual Resources** for the **Abengoa Mojave Solar** project (09-AFC-5) based on my independent analysis of the Application for Certification and supplements thereto, data from documents and sources deemed to be reliable, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010

Signed: Original signed by T. Packard

At: Oakland, California

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# TOM PACKARD

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## & ASSOCIATES

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**Thomas Packard, ASLA**  
**Tom Packard & Associates**

Tom Packard is a freelance planning consultant who specializes exclusively in scenic resource planning, visual impact assessment, and visual impact mitigation. Educated in landscape architecture, Mr. Packard has over 23 years of experience preparing scenic resource management plans and conducting visual impact studies. He has worked in both the private and public sector on projects ranging from urban and parkland development to transportation, mining, and major utilities. Much of his work during the past five years has been in the Lake Tahoe Basin. Mr. Packard has designed and conducted comprehensive visual surveys of landscapes covering large areas as the basis for developing land use and resource management plans. He has designed and implemented public perception studies as a means of determining visual impacts of projects that have unique circumstances. He is experienced in the technical application of all major visual assessment methodologies, particularly the Scenery Management System employed by the USDA Forest Service, the Visual Management System used by the Bureau of Land Management, and the Tahoe Regional Planning Agency's Scenic Resource Threshold system. Mr. Packard lectures on the subject of visual resource management and impact assessment.

### **Selected Project Experience**

- Principal Investigator and Project Manager for the **Landscape Inventory and Character Type Mapping of the Shoreline Area of Lake Tahoe**. This project was conducted for the Tahoe Regional Planning Agency as part of its 2007 update of the Regional Plan for the Lake Tahoe Basin. The inventory, which examines the Tahoe Basin landscape as seen from the surface of Lake Tahoe, provides detailed tabular and photographic documentation of the landscape's physical features and appearance characteristics. The inventory focuses on attributes of the natural landscape and the characteristics of human development. The data was used to define and map shoreline landscape character types and determining their ability to absorb human development without a loss in visual quality or exhibit undesirable changes in visual character. The information is suitable for formulating spatially explicit design guidelines that account for and respond to the specific landscape conditions in each area.
- Principal Investigator of scenic resources for the proposed **Stateline to Stateline Bike Trail Project**. The proposed project, presently in the planning stages, consists of a continuous, 30-mile long bike trail from North Stateline around the east side of Lake Tahoe to South Stateline. As part of a multi-disciplinary team, scenic resources are being studied to identify opportunities and constraints of potential routes for the bike trail. Potential impacts of the bike trail on scenic quality threshold indicators are being determined as part of the environmental review of the project.
- Principal Author and Project Manager of the **Eastshore Drive National Scenic Byway Corridor Management Plan** for 15 miles of State Route 28 along the east shore of Lake Tahoe within the State of Nevada. The Scenic Byway Corridor Management Plan addressed natural and cultural resource protection, interpretation of significant features, issues associated with limited parking, and provision of public access to beaches. The study area, from Incline Village south to Spooner Summit, receives heavy, year-round recreation use. Worked directly with the Scenic Byway Steering Committee throughout the project. Coordinated the involvement of the Tahoe Regional Planning Agency, Nevada DOT, US

Forest Service, Nevada Division of State Parks, county agencies and local jurisdictions, private citizens and public special interest groups.

- Principal Investigator for the **Marin County Local Coastal Program Inventory of Visual and Scenic Resources** as part of the County's recent update of their Local Coastal Plan. The inventory produced mapped, written, and photographic records of the coastal landscape as of February-March 2003. In addition, key viewpoints from which important scenic resources are seen and where outstanding vistas occur were identified and mapped. The County used this information to revise local coastal planning policies that guide future planning decisions.
- Principal investigator of potential visual impacts for the proposed **Beach Club on Lake Tahoe Project EIS**. The proposed project consists of a 20-acre, 142-unit condominium development in Douglas County, Nevada off of US Highway 50 reaching to the shore of Lake Tahoe. It includes a beachfront clubhouse with 159-foot pier. The project's scenic quality impacts were evaluated in accordance with the TRPA Code of Ordinances and Scenic Threshold Standards. The potential effect on TRPA scenic quality threshold indicators (SR-1 through SR-4) was determined by analyzing the visual presence of the proposed project as if built through the use of photo simulations. Compliance with the Code of Ordinances Chapter 30 - Design Standards was also evaluated. In the shoreland portion of the project, consistency with shoreland ordinances was determined by applying the Visual Magnitude – Contrast Rating System.
- Principal Investigator of the **Visual Resource Survey of Point Molat ** as part of the San Pablo Peninsula Open Space Study. The study involved cataloguing landscape features and characteristics of the study site and the major views that occur within and from the study area located at the north end of the San Francisco Bay. The visual characteristics of topography and landform, vegetation types and patterns, man-made features, shoreline configuration, views to off-site areas, views of on-site areas, and major features of visual interest were recorded. The information was used to analyze landscape character, assess scenic quality, and to identify visual resources opportunities and constrains for potential future public recreation use of the area.
- Member of TRPA Science Team, a panel of 11 different resource experts participating as Core Group members in the **Pathway 2007 Tahoe Regional Plan Update** by the Tahoe Regional Planning Agency and US Forest Service. Mr. Packard was selected as a panel member for his expertise in evaluating scenic resources, his knowledge of the TRPA scenic threshold system, and his understanding of US Forest Service Scenery Management practices. He helped develop proposed modifications to the Scenic Threshold system and scenic resource management strategies for future implementation.
- Principal Investigator of aesthetic resources for the **Cloverdale Ranch Study**, a project of the Peninsula Open Space Trust (POST). The project site is located on along the Pacific Coast on 5,638 acres between Ano Nuevo State Reserve and Butano State Park in San Mateo County, California. The study consisted of an inventory of the landscape and evaluation of scenic opportunities and constraints as part of the process to develop a unified vision and implementation strategy for the preservation, restoration, and enhancement of the ranch land for future public use and enjoyment.

## Other Project Experience

- Investigator of visual impacts for the **Sonoma Country Inn EIR** which evaluated a proposed hillside restaurant, 50-room resort facility, and new winery near the Town of Kenwood in a highly scenic area of Sonoma County along Route 12, a designated State Scenic Highway.
- Principal investigator of visual impacts for the proposed **Village at Loch Lomond Marina Development**, a mixed use, waterfront project in San Rafael, California
- Prepared visual impact assessment as part of the City of Emeryville's **Saint Alban's Senior Housing Project EIR**, California, which studied the potential visual impacts of a proposed high-rise building on the Emeryville Peninsula on the east shore of San Francisco Bay.
- Principal investigator of visual/aesthetic and shadow impacts of the proposed **Rincon Sports and Entertainment Center** in downtown San Francisco, which considered view blockage and consistency of the visual character, mass, and scale of the proposed project with existing development in the surrounding area.
- Principal Investigator and Project Manager for the visual impact assessment of the **NAS Alameda Reuse Plan EIS/EIR**.
- Co-Investigator and Project Manager for the visual impact assessment of the **NS Treasure Island Reuse Plan EIS/EIR**.
- Prepared the visual analysis for the City of San Leandro's **Lake Chabot Terrace Project EIR**, California, which examined the potential visual effects of developing a 60-acre quarry site with approximately 137 single-family houses, identified building and layout design alternatives, and suggested ways to reduce or avoid adverse visual effects.
- Principal Investigator and Project Manager of the **Visibility Study of the East Palo Alto University Circle Redevelopment Project** that evaluated the degree of visual intrusion on Palo Alto neighborhoods that would result from two proposed 275-foot office towers and associated development in nearby East Palo Alto.
- Principal Investigator and Project Manager of the **Lafayette Athletic Club Visibility Study**.
- Prepared visual analysis for the **North Wavecrest Redevelopment Project Specific Plan and EIR** which examined the potential effects of subdividing and developing a vacant 490-acre coastal site immediately adjacent to State Highway 1 (Cabrillo Highway) and the Pacific Ocean in the City of Half Moon Bay, California.
- Principal Investigator of visual impacts for the **Palo Verde Ranch EIR** for a 340-unit subdivision project located on 485 acres of land along the south side of I-580 between Pleasanton and Hayward, California.
- Prepared visual analysis for the Town of Ross' **Monte Bello Subdivision EIR**, California, which examined the potential effects of subdividing a 37-acre vacant site immediately adjacent to a local park and Marin Municipal Water District watershed lands.
- Principal Investigator and Aesthetic Resource Analyst for the **West Pleasanton Expanded Planning Area Study**.
- Principal Investigator of potential visual impacts of various development scenarios for the **Bernal Property** in Pleasanton, California.
- Principal investigator of visual impacts for the proposed **Academy Heights Residential Development**, a high-end development project of seven lots in San Rafael, California.
- Principal Investigator of visual impacts for the **Paulsen-Whiting Bridge Replacement Project** in Watsonville, California.
- Principal Investigator of scenic impacts for the **Sierra Colina Village Project**, a proposed multi-unit residential development at Stateline, Nevada within the Lake Tahoe basin.
- Co-investigator for visual impact study of a proposed **Home Depot Development Project** adjacent to Highway 101 at the northern limits of the City of Santa Rosa.

- Co-investigator of visual studies for the **Lake Tahoe Shorezone Development Standards**, Lake Tahoe Basin which evaluated proposed Shorezone Development Standards for consistency with the Lake Tahoe Scenic Thresholds.
- Principal Investigator for the **Sign Ordinance and State Route 28 Beautification Plan Evaluation** in Lake Tahoe's North Stateline casino area at Crystal Bay, Nevada that assessed the effect of new commercial signs and proposed streetscape improvements relative to TRPA's scenic resource thresholds.
- Prepared visual analysis of the proposed **Hyatt Lake Tahoe Expansion Project** at Incline Village, Nevada.
- Project Manager of the **Roundhill to Stateline 120-kV Transmission Line EIR/EIS** and Principal Investigator for visual, land use, recreation and earth resources.
- Principal Investigator and Project Manager for the **Kingsbury Grade Scenic Mitigation Plan** for the lower portion of Kingsbury Grade (Nevada State Route 207) in Douglas County, Nevada.
- Principal Investigator and Project Manager for the **Mono Lake Basin Visual Resource Impact Analysis** in conjunction with the California State Water Resources Control Board's EIR for the Review of Mono Basin Water Rights of the City of Los Angeles.
- Principal investigator and project manager for the **Bodie Project Visual Resources Program**, Mono County, California that assessed the potential effects of proposed mineral exploration and possible future mine development on the visual resources of the region, particularly the "ghost town" of Bodie.
- Principal Investigator for the visual/aesthetic impact analysis of the **New Melones Lake Resource Management Plan (RMP)**, and **Environmental Report**, for the U.S. Bureau of Reclamation in California.
- Principal Investigator for the visual resource component of the **Cascade Reservoir Management Plan** for the U.S. Bureau of Reclamation.
- Principal Investigator and Project Manager for the **Statewide Scenic Highway Inventory and Eligibility Review** to identify state highways throughout California that are currently listed as eligible for State Scenic Highway designation but no longer meet the criteria for official designation.
- Principal Investigator and Project Manager for the visual analysis of the **Pittsburg/Antioch Transportation Corridor Study** that examined the visual impacts of three transportation alternatives between Concord and Antioch, California.
- Principal Investigator and Project Manager for the visual impact analysis of the **Rt. 101 Widening Project**, a major state highway improvement project through downtown Santa Rosa, California which involved adding new lanes to the highway and the removal of substantial amounts of mature trees and shrubs along a three mile stretch.
- Principal Investigator and Project Manager for the visual impact assessment of the **Rt. 84 Freeway Project** in Fremont, California, to U.S. Highway 101.
- Principal Investigator and Project Manager for the visual impact assessment of the **Rt. 87 Freeway Project** from downtown San Jose, California, to U.S. Highway 101.
- Principal Investigator and Project Manager for the **visual impact analysis of major state highway improvement projects** throughout seven Bay-area counties including Sonoma, Marin, Solano, San Francisco, Contra Costa, Alameda, and San Mateo.
- Principal Investigator and Project Manager for the visual analysis of **See-through Bridge Railing Designs** for state highways in California.
- Principal Investigator and Project Manager for the visual impact analysis of the **Rt. 101 Widening Project**, a major state highway improvement project through downtown Santa Rosa, California.
- Lecturer on the **Visual Impact Assessment of Highway Projects** at the California

Department of Transportation Landscape Architecture Academy, Environmental Planning Academy, and Environmental Planning Short Course.

- Principal Investigator for the visual impact analysis of a **Proposed Sign Ordinance Amendment, City of Fremont, California** that would authorize “large” freeway signs in any retail shopping center within the City which abuts a city limit line.
- Principal Investigator of visual impacts for the **Mountain Pass Mine EIR**.
- Principal Investigator for visual resources on the County of Yolo's **Off-Channel Mining Plan** and **Cache Creek Resources Management Plan EIRs for Lower Cache Creek**.
- Principal Investigator and Project Manager for the visual impact assessment of the **VCR Mining Project** in Imperial County, California.
- Principal Investigator and Project Manager for the visual impact assessment of the **Pine Tree Project**, a proposed open pit gold mine and ore processing facilities on 3,200 acres within the historic Mother Lode of Mariposa County, California.
- Principal Investigator and Project Manager for the **Penn Mine Site Long-Term Solution Project Environmental Impact Report; Calaveras County, California**.
- Co-investigator and Project Manager for the visual analysis of the proposed **Marsh Canyon Landfill** in Contra Costa County, California.
- Co-investigator for the visual analysis of the **Crockett Co-Generation Project**, a proposed facility at the existing C&H sugar plant in Crockett, California.
- Principal investigator for the visual analysis of **Idaho Power Company's Bliss, Lower Salmon Falls and Upper Salmon Falls Hydroelectric Projects** in conjunction with FERC re-licensing studies.
- Principal investigator for Aesthetic Resources as part of the FERC license application for **PacifiCorp's North Umpqua Hydroelectric Project**.
- Principal investigator of aesthetic impacts of PG&E's **Pitt No. 1 Hydroelectric Development** on the Pitt River in northeastern California situated in the Cascade region between Mt. Shasta and Mt. Lassen near the confluence of the Fall River and Pit River.
- Principal Investigator for the visual resource component of **PacifiCorp's Powerdale Hydroelectric Project FERC Relicensing Project** located on the Hood River, Oregon, 1 mile upstream of the Columbia River and partially within the Columbia River Gorge National Scenic Area.
- Principal Investigator for the visual resource component of **PacifiCorp's Yale Hydroelectric Project FERC Relicensing**, located on the Lewis River, Washington.
- Principal Investigator for visual resources for FERC relicensing of **Washington Water Power's Clark Fork Projects** in northwestern Montana and author of an Aesthetics Management Plan which identifies enhancement and mitigation measures and describes strategies to protect scenic resources over the life of the project license.
- Co-investigator of overall aesthetic impacts related to the proposed **El Portal Hydroelectric Development** on the Merced River at the western entrance to Yosemite National Park.
- Principal Investigator of visual impacts for the FERC re-licensing for PG&E's **Haas Kings Hydroelectric Project** in the highly scenic King's River region of California's central Sierra Nevada mountains.
- Co-investigator of impacts for the **SMUD/SPPCo Trans-Sierra 500kV Intertie Transmission Line** project.
- Principal Investigator and Project Manager for the visual impact assessment and environmental assessment of the **Carson City Transmission Line Relocation Project**.
- Principal Investigator for the visual impact assessment of the **CIP to Waiiau 138 kV Transmission Line Project** which analyzed candidate routes through rural, suburban and urban settings, including shore zone management areas of Oahu.
- Principal Investigator and Project Manager for the visual impact assessment of the



### **Sagebrush Mojave-Vincent 230-kV Transmission Line Project.**

- Principal Investigator and Project Manager for the **Tonkin Spring Transmission Line Environmental Assessment.**
- Principal Investigator and Project Manager for the **Cove 120-kV Transmission Line Environmental Assessment.**
- Principal Investigator for visual impacts for the **El Vado to Abiquiu Transmission Line.**
- Project Manager and Principal Investigator for the development of award-winning courtroom graphics for the **U.S. Department of Justice Reserved Water Rights Case.**
- Project Manager and Principal Investigator for the development of award-winning courtroom graphics for the **U.S. Department of Justice South Florida Everglades Litigation.**

### **Education**

- B.L.A., University of Illinois, 1983
- M.L.A. Program, University of Illinois, Land Resource Planning track with concentration on visual assessment

### **Memberships**

- American Society of Landscape Architects

### **Honors and Awards**

- ASLA Honor Award, 1990, U.S. Department of Justice Reserved Water Rights Case
- ASLA Merit Award, 1995, U.S. Department of Justice South Florida Everglades Case
- Sigma Lambda Alpha, Honor Society for Academic Excellence in Landscape Architecture

**DECLARATION OF  
William D. Kanemoto**

I, William Kanemoto, declare as follows:

1. I am presently under contract with Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division. I am serving as a Visual Resource Specialist to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I participated in preparation of staff rebuttal testimony on Visual Resources for the **Abengoa Mojave Solar Project** based on my independent analysis of the Application for Certification and supplements hereto, data from documents and sources deemed to be reliable, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.
5. I am personally familiar with the facts and conclusions applicable to the vapor plume simulations and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010

Signed: 

At: Oakland, California

## **William Kanemoto**

Visual Resource/Aesthetics Analyst

### **Academic Background:**

M. Landscape Architecture, University of Michigan, Ann Arbor, 1982  
B.A. Liberal Arts (Honors), University of California, Santa Cruz, 1973

### **Professional Experience:**

Principal

William Kanemoto & Associates, Oakland, California, 1993 - Present

William Kanemoto is Principal of William Kanemoto & Associates, an environmental consulting practice specializing in visual analysis and computer visualization in the context of environmental review. In this capacity he has served as principal investigator for visual analysis and simulation on a wide range of major infrastructure and development projects, including the High Desert Power Project AFC, Port of Oakland Expansion EIS, Route 4 East/Pittsburg BART EIS, FMC Substation and Transmission Line PEA, and numerous other infrastructure and transportation projects. Mr. Kanemoto received recognition from the California Association of Environmental Professionals for visual analysis, computer simulation, animation, and video production for the Stanford Sand Hill Road Projects EIR, prepared by EIP Associates and judged 'Best State-Wide EIR of 1997'.

Associate Director

Environmental Simulation Laboratory,  
Institute of Urban and Regional Development,  
Center for Environmental Design Research  
University of California, Berkeley, 1994 - 2000

Instructed graduate students in the College of Environmental Design, U.C. Berkeley, served as consultant on various major planning projects in the San Francisco Bay Area, and conducted design collaborations with counterparts at Keio University and ARK CyberUniversity in Tokyo, Japan via the Internet.

Principal Investigator/Project Manager

Dames & Moore, San Francisco/Oakland, California, 1988-1992

Served as principal investigator of numerous visual analyses of major infrastructure projects throughout the U.S., in Europe, and in Asia. Gained extensive familiarity with the application of a wide range of professionally accepted visual assessment techniques in the context of CEQA, NEPA, and related regulatory requirements of the CPUC, CEC, FERC, DOT, U.S. Forest Service, BLM, and other agencies.

Project Manager

LSA Associates, Pt. Richmond, California, 1987-1988

Project manager and planner on environmental impact reports for various residential and commercial development projects in northern California.

Environmental Planner

Holton Associates, Berkeley, California, 1984-1987

Preparation of various resource and regulatory studies including EIRs, FERC Exhibit E, Section 404 alternative analyses, riparian restoration studies, and cumulative impact methodology studies for EPRI and Sierra County, CA.

DECLARATION OF  
JAMES EARL JEWELL

I, James Earl Jewell, declare as follows:

1. I am currently under contract with the Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-05-002 I am serving as an Illuminating Engineer to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program.
2. A copy of my professional qualifications and experience is attached hereto and incorporated herein.
3. I assisted in the preparation of the staff rebuttal testimony on **Visual Resources** for the **Abengoa Mojave Solar** project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable sources and documents, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is accurate and valid with respect to the issues addressed therein.
5. I am familiar personally with the facts and conclusions applicable to matters of intrusive light and glare and relative brightnesses, and if called as a witness, could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010 Signed: Original signed by J. E. Jewell

At: San Francisco, California

JAMES EARL JEWELL, LC, ATF, IES, CIES (Hon), SAH

EDUCATION:

BA, College of the Pacific  
MFA, School of Drama, Yale University

EMPLOYMENT:

1957-67, Engineering Division, Holzmüller Corporation  
1967-69, Theatre Consulting Service, Bolt, Beranek & Newman  
1969-87, Lighting Services Administrator, Pacific Gas & Electric Company  
1987- present, Consultant in Lighting  
Since 1993 in association with Alan Lindsley, AIA, IES

PROFESSIONAL ACTIVITIES:

Illuminating Engineering Society  
President – 1984-85  
Vice President – 1983-84  
Director – 1979-86  
Office Lighting Committee – 1976 - present, Chairman, 1978-80  
Roadway Lighting Committee – 1974 – present, Chairman, 1990-92  
Regional Energy Committee Chairman – 1974-76, 1978-84  
Energy Advisory Committee – 1973-75  
Technical Missions – China – 1984, 1987, 1988

European Lighting Congress: Strasbourg, 1969; Florence, 1977; Granada, 1981;  
Lausanne, 1985; Budapest, 1989; Edinburgh, 1993; Berlin, 2001

Pacific Basin Lighting Congress: Chairman, Shanghai, 1989; Bangkok, 1993;  
Nagoya, 1997; Organizing Committee, Delhi, 2002; Cairns, 2005; Bangkok,

2009

Edison Electric Institute: Street Lighting Committee – 1971-87, Chairman 1979-81

International Commission on Illumination:

Board of Administration – 1983-87, 1987-91  
Division Four (Lighting for Transport)  
Technical Committee 4.34 -- 1980-95  
Technical Committee 4.25 -- 1992-99

Professional Light Designers Convention: London, 2007; Berlin, 2009

Expert Witness – Admitted as an expert witness in the Superior Courts of Amador,  
Contra Costa, and San Francisco Counties.

## AWARDS AND HONOURS:

IES Regional Technical Award – 1985  
IES Distinguished Service Award – 1986  
College of Fellows of the American Theatre --1988  
Honourary Member, China IES – 1989  
CIE Distinguished Service Award – 1991  
IES Louis B. Marks Award – 1993

## CERTIFICATION:

LC – Granted in 1990 by the National Council on the Qualification of Lighting Professionals

## RELEVANT WORK EXPERIENCE:

With PG&E appeared before CEC Committee and Staff on lighting issues with respect to the siting and licensing of Geysers steam power plants.

On behalf of PG&E and the IES appeared before the Simonson Committee to consult on the development of the lighting portions of Title 24.

On behalf of PG&E and the IES appeared before the CEC on numerous occasions to support the development of fluorescent lamp promotional programs and to assist in developing rigorous lighting ballast standards for California and on other lighting energy management issues.

While at PG&E supported and oversaw funding for projects on daylight following and electronic ballasts. Projects supported by both the DOE and CEC.

In practice as a lighting consultant worked with private clients and jurisdictions on matters concerned with light trespass and “intrusive” lighting.

JEJewell  
19 February, 2010

## DECLARATION OF Ellen Townsend-Hough

I, **Ellen Townsend-Hough** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Siting Office of the Energy Facilities Siting Division as an Associate Mechanical Engineer.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I helped prepare the staff rebuttal testimony on **Waste Management** for the **Abengoa Mojave Solar** project (09-AFC-5) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.
4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.
5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 23, 2010 Signed: Original signed by E. Townsend-Hough

At: Sacramento, California

# Ellen Townsend-Hough

## SUMMARY

I am a chemical engineer with 27 years of experience. My professional career has afforded me many unique growth and development opportunities. I have a working knowledge of the California Environmental Quality Act. My strengths are in analyzing and performing complex environmental engineering analyses, in areas such as Waste Management, Hazardous Materials Management, Worker Safety, and Water Resources. I worked as a policy advisor to a California Energy Commissioner for three years. I am also an US Environmental Protection Agency Environmental Justice trainer.

## PROFESSIONAL EXPERIENCE

### Writing

- Write letters, memos, negative declarations, environmental impact reports that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

### Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems
- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects
- Provides licensing recommendations and function as an expert witness in regulatory hearings.
- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.
- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure
- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

### Technical Skills

- Establish mitigation that reduces the potential for human exposure to levels which would not result in significant health impact or health risk in any segment of the exposed population.
- Assist with on-site audits and inspection to assure compliance with Commission decisions.
- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.
- Work with the following software applications: WORD, Excel, and PowerPoint.

### Policy Advisor



- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.
- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.
- Represent Commissioner's position in policy arenas and power plant siting discussions.
- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.
- Wrote speeches for the Commissioner's presentations.

## **EDUCATION**

Bachelor of Science, Chemical Engineering  
Drexel University, Philadelphia Pennsylvania

### Continuing Education

*Hazardous Material Management Certificate, University California Davis  
Urban Redevelopment and Environmental Law, University of California Berkley  
Analytical Skills, California Department of Personnel Administration (DPA) Training Center  
Legislative Process/Bill Analysis, DPA Training Center  
Federally Certified Environmental Justice Trainer*

***References furnished upon request.***



**DECLARATION OF SERVICE**

I, April Albright, declare that on June 29, 2010, I served and filed copies of the attached Energy Commission Staff's Rebuttal Testimony to the Applicant's Opening Testimony – Declarations and Resumes (Exhibit 306), dated June 29, 2010. The original documents, filed with the Docket Unit, are accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [<http://www.energy.ca.gov/sitingcases/abengoa/index.html>].

The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

**(Check all that Apply)**

**For service to all other parties:**

sent electronically to all email addresses on the Proof of Service list;

by personal delivery;

CDs delivered on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date. **Hard copies are available upon request.**

**AND**

**For filing with the Energy Commission:**

sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);

**OR**

depositing in the mail an original and 12 paper copies, as follows:

**CALIFORNIA ENERGY COMMISSION**

Attn: Docket No. 09-AFC-5  
1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Original signed by: \_\_\_\_\_  
**April Albright**