From: "Karen Mitchell" <kam@eslawfirm.com>
To: <sdeyoung@brightsourceenergy.com>, <tstewart@brightsourceenergy.com>, <j...
Date: 1/8/2010 4:45 PM
Subject: 07-AFC-5 Ivanpah:
Attachments: Applicant's Witness List.pdf; West Yost_Ken Loy resume.pdf; Ivanpah POS - 0 7-AFC-5.pdf

Hearing Officer Kramer:

Per your request, please find attached the Applicant's witness list. Rebuttal witnesses as identified in Applicant's rebuttal testimony are shown in red text.

Tim Durbin, Applicant's witness on groundwater resources, will be unavailable for the evidentiary hearings. On Thursday, January 7, 2010, Mr. Durbin underwent a second major surgery and is unavailable. Ken Loy, Mr. Durbin's colleague, will be adopting Mr. Durbin's testimony on the issue of groundwater resources, and will be available for cross-examination. Attached is Mr. Loy's resume.

Docket Unit: Please file these documents in the above referenced proceeding with today's date. A hard copy will follow in the U.S. Mail. Thank you.

Karen A. Mitchell, Paralegal
Ellison, Schneider & Harris L.L.P.
2600 Capitol Avenue, Suite 400
Sacramento, CA 95816-5931
(916) 447-2166 phone
(916) 447-3512 fax

DECLARATION OF
KENNETH L. LOY

I, Kenneth L. Loy, declare as follows:

1. I am presently employed by West Yost Associates as a Principal Hydrogeologist.
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.
3. I am adopting the testimony of Tim Durbin on groundwater resources for the Ivanpah Solar Electric Generating System project based on my independent analysis 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 herein.
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: January 8, 2010 Signed: Kenneth L. Loy

At: Davis, California

Applicant's Revised Witness List

Topic	Party	Witnesses
VISUAL RESOURCES	Applicant	Dr. Thomas Priestley (NOTE: red text indicates rebuttal witness)
PROJECT DESCRIPTION	Applicant	Steve De Young, Todd Stewart, Tom Reagan and John Carrier
PROJECT ALTERNATIVES	Applicant	John Carrier, Steve De Young, Gary Rubenstein, Steve Hill, Tom Priestley, Geoffrey Spaulding, Arne Olson and Roger Gray
POWER PLANT RELIABILITY	Applicant	Todd Stewart (NOTE: per order, combined with Soil and Water)
AIR QUALITY	Applicant	Steve Hill and Gary Rubenstein
WORKER SAFETY/FIRE PROTECTION	Applicant	Steve De Young
BIOLOGICAL RESOURCES	Applicant	John Cleckler, Mark Cochran, Amy Hiss, Geof Spaulding, Ann Howald, Russ Huddleston, John Carrier, Steve De Young, and Andy Sanders
SOIL AND WATER RESOURCES	Applicant	Matthew Franck, Kathy Rose, Kenneth Loy, Mark Kubik, and Tom Reagan (NOTE: Matthew Franck was identified in Applicant's Opening Testimony. Kenneth Loy has been substituted for Tim Durbin due to medical reasons. Steve Long was identified in Hearing Officer Kramer's witness list; however, Mr. Long is the technical lead for Soils, which is not subject to live witness testimony.)
CULTURAL RESOURCES	Applicant	Geoffrey Spaulding
LAND USE	Applicant	Jennifer Scholl

Kenneth L. Loy, P.G., C.E.G., C.H.G.

Professional Registrations

Professional Geologist:
California No. 7008

Certified Hydrogeologist
California No. 720

Certified Engineering Geologist
California No. 2214

Professional Affiliations

National Ground Water Association

Association of Engineering Geologists

Groundwater Resources Association

Association of California Water Agencies

Education

M.S., Geohydrology , University of Arizona, Tucson, Arizona; 1990

B.S., Geophysics, University of Arizona, Tucson, Arizona; 1986

Master's Certificate in Project Management, The George Washington University, Washington, DC; 1994

Continuing Education

Principles of Groundwater Flow and Transport Modeling, Groundwater Hydrology Cooperative Extension Program, University of California - Davis and Groundwater Resources Association of California, May 2007

Isotope Methods for Groundwater Investigation, Groundwater Resource Association of California, March 2007

Dairy Groundwater Monitoring Workshop: Regulations, Monitoring Network Design and Data Interpretation, Groundwater Hydrology Cooperative Extension Program, University of California – Davis and Groundwater Resources Association of California, May 2007

Ken Loy is a certified hydrogeologist and engineering geologist with 20 years of experience in engineering consulting with emphasis on hydrogeologic and water quality characterization, data analysis, and modeling. Ken has characterized hydrogeologic conditions, assessed land and water use practices and applied numerical groundwater flow models in conjunctive use evaluations, groundwater impacts analyses and water supply planning efforts. He has performed numerous water quality evaluations and has used numerical flow and transport models to evaluate the movement of groundwater contaminants. He has been involved in several land subsidence evaluations, designed wells, and provided design services during construction of wells.

PROJECT EXPERIENCE

Municipal Well Design and Construction, Sacramento County Water Agency, Sacramento County. Principal Hydrogeologist and Project Manager for the design and design services during construction of three 1,500-foot production wells and a 1,500-foot, stainless steel, dual completion monitoring well located in Elk Grove. The wells were constructed as part of a new development but are the property of Sacramento County Water Agency (SCWA). In addition to serving the needs of the new development, the wells will also replace SCWA supply lost as a result of the implementation of the 10-mg/l federal MCL for arsenic. The effort resulted in a new 6,000-gpm potable groundwater supply in a rapidly developing area of Sacramento County. Typical production depths in the region yield groundwater with arsenic concentrations that can approach the pending 10-µg/l federal MCL. Deeper zones can contain concentrations of manganese and iron that exceed secondary MCLs and require treatment. Increasing salinity with depth places an additional constraint on groundwater production. Hydrogeologic and geochemical evaluations were performed to identify groundwater production depths that optimized water quality, while achieving production requirements. The completed wells met drinking water standards without treatment. *Reynen & Bardis Communities, Sacramento, California.*

Municipal Well Design and Hydrogeologic Consulting Services. Principal hydrogeologist supporting the City of Woodland's (City) municipal well design efforts and efforts to expand and improve the quality of its groundwater supply. The City depends completely on groundwater, which is produced from an intermediate depth. The City sought to expand its groundwater production to meet projected water demands and improve water quality by constructing new wells in a deeper aquifer zone, which, locally, has superior water quality. Ken led the effort to evaluate hydrogeologic conditions and groundwater quality, design the wells, and provide hydrogeologic support during construction. Ken used aquifer zone sampling test resulted from multicompletion monitoring wells and other subsurface information to calculate blended water quality from multiple aquifer zones, which individually exceeded water quality standards for nitrate, arsenic and manganese. He developed a well design to draw water from selected zones predicted to result in blended water quality that would not require treatment. The constructed well does not require treatment for public, potable supply. Ken has assisted the City in well siting prepared Drinking Water Source Assessment Reports and is preparing a groundwater management plan for the City. Ken also used analytical element modeling to assess

Water Rights, Sales and Transfers in California, Lorman Education Services, June 2005

Geographic Information Systems for Practicing Geologist, Association of Engineering Geologists, May 2005

Aerial Photo Interpretation Workshop, Groundwater Resource Association of California, November 2001

Karst for Environmental and Engineering Applications, University of Tennessee, Knoxville, Tennessee

40-Hour Health and Safety Training: OSHA (29 CFR 1910.120)

Hazardous Waste Supervisor Training: OSHA (29 CFR 1910.120)

Presentations

Loy, K.L. and S.C. Macaulay, 2008, "Climate Change and Groundwater Resources," presented at Climate Change: Implications for California Groundwater Management, Water Resources Services 4th Symposium, Groundwater Resources Association of California, Sacramento, CA, August 2008.

Loy, K.L., 2007, "Construction of 32-inch Diameter Blind Shafts in Granodiorite," presented at the Association of Environmental and Engineering Geologists 50th Annual Meeting, Los Angeles, California, September 2007.

Loy, K.L., 2007, "Application of IWFM to the Evaluation of Conjunctive Use in Solano and Yolo Counties," presented at the California Water and Environmental Modeling Forum Annual Meeting, February 2007.

Loy, K.L., 2005, "Hydrogeology of the Squaw Valley Groundwater Basin, California", presented at the Association of Engineering Geologists 48th Annual Meeting, Las Vegas,

potential groundwater impacts caused by the City's new wells. Ken developed a working relationship with the California Department of Water Resources (DWR), Central District. DWR provides in-kind services, including geologic logging and chemical analysis at no cost to the City. *City of Woodland, California.*

City of Santa Rosa Municipal Well Design and Hydrogeologic Consulting Services. Principal hydrogeologist supporting the City of Santa Rosa's efforts to identify and evaluate potential municipal well sites and to design municipal production wells meeting the City's production and water quality requirements. Ken assisted the City in evaluating the hydrogeology of the groundwater basin, assessing municipal and private wells, selecting and evaluating potential municipal well sites, and developing a test drilling and well construction program for two of the sites, which were located in City parks. Test drilling and well construction were conducted with measures to mitigate sound and light pollution and to protect public safety. Geologic and geophysical logging was conducted in partnership with the United States Geological Survey at no additional cost to the client. Aquifer testing and chemical analysis were conducted in the test-production wells to assess yields, hydraulic parameters and groundwater quality, with respect to drinking water standards. Analytical element modeling was used to assess potential groundwater impacts to other wells in the vicinity. *City of Santa Rosa, California.*

Lower San Joaquin River Water Transfer Feasibility Study. Principal hydrogeologist and project manager for the analysis of water transfer alternatives for a 3,500-acre agricultural property located on the lower San Joaquin River. Efforts included evaluation of pre-1914 rights, appropriative licenses and riparian rights; evaluation of possible mechanisms by which water could be made available, including crop shifting, idling and groundwater substitution; and identification of potential buyers. Evaluated groundwater resources for the property and designed and implemented a test drilling, monitoring well construction and groundwater quality sampling program. The California Department of Water Resources, Central District provided geological and analytical services during the drilling program at no cost to the client. Recent activities include negotiations with a potential buyer and preparation of a Petition for Temporary Urgency Change, which will be submitted to the State Water Resources Control Board. *Confidential Client, California.*

Upper Sacramento Valley Well Construction and Aquifer Testing. Principal hydrogeologist and project manager for investigation and hydraulic testing of the Lower Tuscan Aquifer. Scope of services include providing technical support to legal challenges; developing a phased, multi-year aquifer test work plan; providing geologic expertise during drilling of three, 1500-foot test holes extending to the base of fresh water, designing five 1,500-foot production wells; overseeing construction of the production wells; and implementing the aquifer test work plan. The work is conducted in association with the California Department of Water Resources, Northern District. *Stony Creek Fan Partners, California.*

Hydrogeologic Consulting Services. Ken was the principal hydrogeologist and project manager on this effort to evaluate the feasibility of using groundwater as a supplement to Reclamation District 2068's existing Delta water supply. Ken led the effort to assess the availability and quality of groundwater, the potential for impacts to stakeholders and the environment, and the costs of developing a conjunctive use program. These efforts included obtaining and evaluating available hydrostratigraphic, geophysical and water level and quality data; drilling and logging test borings; constructing nested monitoring wells; conducting aquifer testing; performing quarterly

Nevada, September 2005.

Bogle, F.R., L. Haines, and K.L. Loy, 1999, "Hydrogeologic Investigation of a Fold and Fault Controlled Karst Groundwater Basin, Hamilton County, Tennessee," presented at the National Groundwater Association 51st National Convention, December 1999.

Loy, K.L., J.L. Lin, and J.A. Matos, 1998, "Analysis of Groundwater Remedial Options using Analytical and Numerical Modeling and Computer Visualization," presented at the National Groundwater Association 50th National Convention, December 1998.

Bogle, F.R. and K.L. Loy, 1995, "The Application of Thermal Infrared Thermography in the Identification of Submerged Springs in Chickamauga Reservoir, Hamilton County, Tennessee," The Fifth Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst, Gatlinburg, Tennessee, April 1995.

Johnson, R.A. and K.L. Loy, 1992, "Seismic Reflection Evidence for Seismogenic Low-Angle Faulting in Southeastern Arizona," Geology 20, no. 7: 597–600.

water level monitoring and semiannual water quality sampling; establishing and performing the initial survey of a land subsidence benchmark tied to the Yolo County Subsidence Monitoring Network; performing IWFM modeling to assess the effects of full-scale groundwater production on groundwater elevations; preparing a feasibility study report; preparing a groundwater management plan; and conducting community outreach. *Reclamation District 2068, Yolo and Solano Counties, California.*

Placer County Regional University Water Planning Studies and Modeling. Ken is the principal hydrogeologist and project manager for water, recycled water, and wastewater planning studies for the Regional University project in Placer County. The water supply strategy calls for initial reliance on groundwater with a gradual transition to an integrated supply of treated surface water, groundwater, and recycled water. Groundwater impacts were assessed using MODFLOW and IGSM. A MODFLOW model was developed using the conceptual model for the regional-scale IGSM. Drawdown for various scenarios was then modeled using MODFLOW application and superimposed on the IGSM results to assess project impacts. *KT Communities, Placer County, California.*

Hydrogeologic Characterization and Modeling. Ken was the principal hydrogeologist and project manager on a multi-year study of the Squaw Valley watershed. These efforts included analysis of annual snow pack, stream gauging, development of rating curves, groundwater level monitoring, water quality analysis and monitoring well installation using the resonant sonic method. A conceptual model of the groundwater basin was developed, and MODFLOW was used to estimate the yield of the aquifer under a range of hydrologic conditions and pumping scenarios. Tools were developed for estimating the available groundwater supply based on snowpack thickness and stream flow. *Squaw Valley Public Service District, California.*

Groundwater Impact Analysis and Modeling. Ken was the principal hydrogeologist and project manager during assessment of potential groundwater impacts due to a proposed gravel mine in Dry Creek, Sacramento County. Ken analyzed the geology, land use and water use of the area and developed a conceptual site model that was used to assess potential impacts to groundwater levels, groundwater quality and flow in Dry Creek. The assessment was performed using IGSM and a water balance approach. IGSM was used to assess potential impacts at a regional scale. The water balance was used to assess localized affects, including to a perched aquifer in Dry Creek stream channel deposits. *Sacramento County Department of Environmental Review and Assessment.*

Hydrogeologic Consulting Services for the University of California and City of Davis. Ken was the principal hydrogeologist and project manager for aquifer testing of deep municipal wells operated by UC Davis and the City of Davis. The effort included design of the tests; procurement, installation and operation of data loggers; data collection; and aquifer test analysis. The largest test involved pumping at a rate of approximately 2,500 gallons per minute for nearly two weeks. The aquifer test data were corrected for background water level trends, fluctuations in barometric pressure due to storm events, and earth tides prior to calculation of the hydraulic properties of the aquifer. Ken also participated in the evaluation of aquifer recharge characteristics using standard water quality analyses, stable isotopes, and carbon-14 dating. Ken worked with UC Davis/City operations staff to coordinate pumping tests with ongoing water system operations. *Cities of Davis and Woodland, California and University of California at Davis.*

Hydrogeologic Consulting Services. Ken was the principal hydrogeologist and project manager for the City of Petaluma's groundwater feasibility study. This work included providing hydrogeologic support during construction of new municipal production wells, evaluation of the condition and capacity of existing wells, assessment of the hydrogeology of the groundwater basin, and aquifer testing. The City currently relies on surface water supply from the Sonoma County Water Agency to meet water demands. The reliability of this supply is currently in question; particularly in regards to expansion of the supply to meet increasing needs as the City grows. Ken led the effort to evaluate integration of groundwater into the City's planning to meet increasing demands, either as a permanent supply or to meet peaking and/or emergency supply needs. Potential supply deficits that could be faced by the City in the future and the water quality issues associated with use of existing and proposed wells were considered in the development of alternatives for conjunctive use of surface and groundwater to meet future demands. The work also included the development of long-term objectives for the City for management of its underlying groundwater basin; development of long-term policies to protect the quality and production; and recommendations for groundwater monitoring. *City of Petaluma, California.*

Groundwater Management Planning. Ken was the principal hydrogeologist and project manager during evaluation of SB 1938 basin management objectives for the Solano Sub-basin. Some of the sub-basin stakeholders adopted groundwater management plans in the late 1990's. Ken supported Solano County Water Agency's efforts to evaluate the existing groundwater management plans and identify basin management objectives that the stakeholders held in common. The effort involved reviewing existing groundwater management plans, agreements and technical studies, and meeting with the stakeholders to develop consensus on basin management objectives. The outcome of the effort was a technical document that is available to guide preparation of individual SB 1938 groundwater management plans by sub-basin stakeholders. *Solano County Water Agency, California.*

Groundwater Management Planning. Ken was West Yost Associate's principal hydrogeologist and project manager during preparation of a SB 1938 groundwater management plan for UC Davis and the City of Davis. UC Davis and the City rely solely on groundwater for potable supply. The groundwater management plan was prepared and adopted jointly and has been implemented by the two agencies to help manage groundwater salinity, groundwater levels and land subsidence. *University of California, Davis, and City of Davis, California.*

Hydrogeologic Characterization/Groundwater Management Planning. Ken was the principal hydrogeologist during evaluation of groundwater resources in Dunnigan Water District. Ken evaluated and documented hydrogeologic conditions including aquifer hydraulic properties, recharge sources and potential, historical variations in storage with hydrologic conditions, water quality, typical well construction and typical well yield. Ken also provided recommendations supporting preparation of a SB 1938 groundwater management plan, including recommended groundwater monitoring locations, stream gauging locations and recommendations for the content of the plan. *Davids Engineering, California.*

Groundwater Management Planning. Ken was the principal hydrogeologist and project manager during preparation of a SB 1938 groundwater management plan for Reclamation District 2068. The adopted plan includes DWR's required and recommended components for SB 1938 groundwater management plans. Currently, the District does not use groundwater, and the plan is used to guide baseline data collection, including groundwater levels, groundwater quality and land subsidence potential. The

groundwater management plan can also be used in the future, if the District chooses to adopt a conjunctive use program. *Reclamation District 2068, California.*

ASR Well Evaluation. Evaluated the historical and projected supply and demand with and without the ASR project, developed a summary of the hydrostratigraphy, aquifer hydraulic parameters, and groundwater flow and quality characteristics obtained from published and unpublished reports and California Department of Water Resources (DWR) records. Developed a preliminary conceptual model of the groundwater basin, estimated the potential storage of the basin and evaluated the potential yield of an ASR well and its affect on storage in the groundwater aquifer near Yountville. Evaluated water quality information to assess the potential for adverse effects due to chemical reactions between recharged treated surface water, groundwater, and the aquifer. Selected possible ASR well sites, and developed a conceptual design, conceptual implementation plan and budgetary cost estimate for the ASR system. Identified potential sources of funding for construction of the ASR system and prepared a construction grant application for funding under the Groundwater Storage Program of the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Bond Act (Proposition 13). *Town of Yountville, California.*

Groundwater Resource Study. Evaluated potential for development of a new nonpotable groundwater supply beneath the San Mateo Plain, southwestern San Francisco Bay region. Interviewed staff at USGS, local universities and regulatory agencies to identify and obtain site-specific subsurface information for the project site. Evaluated the potential well yield and water quality and assessed the risk of saltwater intrusion and land subsidence should the resource be developed. *Confidential client, Redwood City, California.*

Land Subsidence Study. Evaluated land subsidence caused by groundwater withdrawal in the Chino Basin, southern California. Used well construction information, geophysical logs, groundwater production and elevation records, land survey information and interferometric synthetic aperture radar (InSAR) to assess the historical magnitudes and rates of land subsidence. Performed a qualitative evaluation of the risks of further subsidence over a range of hypothetical scenarios in which groundwater production and artificial recharge were increased through the year 2020. *Confidential client, Pasadena, California.*

Land Subsidence Studies. Research assistant participating in USGS land subsidence studies using wellhead and extensometer measurements, microgravity and GPS. Participated in establishing land subsidence monitoring networks in Avra Valley, the Tucson Basin and the Picacho Basin (upper and lower Santa Cruz River basins). Research assistant for projects involving collection, processing and interpretation of geophysical data used to characterize engineering properties at proposed Superconducting Supercollider sites in Arizona. Managed the University of Arizona's geophysical database. *University of Arizona, Tucson, Arizona.*

Groundwater Investigations. Conducted geologic, hydrogeologic and geophysical evaluations in the eastern United States and Virgin Islands. Responsibilities included development of project objectives, investigation design, data collection and interpretation, report preparation, and task management. Hydrogeologic activities included: geologic mapping and structural analysis of Valley and Ridge structures; design and implementation of bedrock drilling programs; dye trace testing in fractured bedrock and karst aquifers; groundwater flow and transport modeling; aquifer test analysis; and providing input to engineering design. Geophysical activities included

location and delineation of buried structures using electromagnetic induction, magnetics and ground penetrating radar. *Various clients, Eastern United States.*

Hydrogeologic Investigations. Conducted environmental and hydrogeologic investigations on Terceira, Azores Archipelago, Portugal. Conceived and developed work plans for vanguard hydrogeological investigations at this remote volcanic island after performing extensive background research in Portuguese technical references and European Economic Community environmental regulations. *United States Air Force.*

Hydrogeologic Investigations. Conducted geologic, hydrogeologic and geophysical characterization projects in California. Responsibilities included survey design, data collection and interpretation, and report preparation. Hydrogeologic efforts included aquifer test analysis and drilling and stratigraphic logging. Geophysical activities included fault studies and assessment of engineering properties using seismic refraction (GRM), resistivity, and induced polarization. *Various clients, Southern California.*

Redevelopment of a Former Semiconductor Manufacturing Facility. Ken was the project manager and principal hydrogeologist during redevelopment of the Fairchild Semiconductor site in Mountain View, California. The project involved management of the environmental aspects of the approximately $250MM redevelopment of a 22-acre National Priority List site with extensive dense non-aqueous phase liquid contamination consisting primarily of chlorinated volatile organic compounds. The remedy included a 100-foot deep slurry wall that fully enclosed the site at its perimeter; groundwater extraction and treatment from a multiple aquifer system; and soil vapor extraction. The main elements of the redevelopment included decontamination and decommissioning of the approximately 120,000 square foot manufacturing facility and associated infrastructure, regrading of the entire site and construction of a corporate campus for a major IT firm. The objective of environmental management aspects of the project were to maintain the redevelopment schedule at minimum incremental cost relative to the cost of remediation without site redevelopment, while remaining in compliance with the Record of Decision and Consent Decree enforced by U. S. EPA Region XI. Other directly involved regulatory agencies included the California Regional Water Quality Control Board, San Francisco Bay Region, Santa Clara Valley Water District, Bay Area Air Quality Management District and the City of Mountain View (for plan approval and permitting).

Major accomplishments achieved during the redevelopment included:

Achieving clean closure of the soils thus allowing decommissioning of the soil vapor extraction system with a commensurate increase in property value and decrease in remediation cost;

Design and implementation of a well protection, abandonment and relocation plan that allowed preservation of the majority of the approximately 100 site wells in the face of regrading, paving and heavy construction;

Redesign and relocation of the groundwater extraction and treatment system and extraction well field to accommodate the design specifications of the redevelopment project and its construction schedule, while maintaining hydraulic containment of the groundwater contamination.

Supporting activities included preparation and implementation of soil sampling and contingency plans to address the possibility that contaminated soils might be encountered during site redevelopment; planning and implementation of a large scale pilot test for in situ remediation of soil and groundwater using potassium permanganate; characterization, transportation and disposal of contaminated soil discovered during the site grading; engineering design, permitting and

construction of all new facilities and conveyances needed for the new groundwater extraction and treatment system; and all ongoing operations, maintenance, monitoring and reporting requirements.

All environmental activities were conducted without delays within the approximately two-year span of the overall redevelopment schedule. The environmental management costs were within the range of the original estimate, and the efforts yielded substantial aesthetic and cost benefits by achieving soil closure and decommissioning the soil vapor extraction system. *Mountain View, California.*

Redevelopment of a Former Industrial Site. The project involved management of the environmental aspects of the redevelopment of a 20-acre former industrial site in Fremont, California. The site had been used for a variety of industrial uses and contained residual petroleum hydrocarbon and chlorinated volatile organic compound contamination in soil and groundwater. The site was redeveloped as a business park. Major accomplishments during the redevelopment included achieving acknowledgment from the California Regional Water Quality Control Board, San Francisco Bay Region and Alameda County Water District that no further soil remedial action was needed, and limiting groundwater actions to semiannual monitoring with minimal reporting requirements.

Supporting activities included providing technical information and position papers to the regulatory agencies on the client's behalf; conducting a human health risk assessment focused on the occupants of the business park; providing technical justification for the lack of a viable groundwater pathway; maintaining the monitoring well network through the site redevelopment; and monitoring and reporting requirements.

All environmental activities were conducted without delays within the overall redevelopment schedule. The environmental management costs were within the range of the original estimate, and the efforts yielded substantial aesthetic and cost benefits by achieving soil closure and limiting groundwater remedial actions to semiannual monitoring. *Fremont, California.*

Sacramento Railyards Superfund Site Evaluations. Principal hydrogeologist for the assessment of environmental conditions at the Sacramento Railyards Superfund site. Obtained and reviewed remedial investigation reports, groundwater monitoring reports, and feasibility studies to assess the potential for proposed underground construction and groundwater pumping to be affect or be affected by soil and groundwater contamination. Developed and assessed scenarios to evaluate costs associated with alternative construction approaches. State of California Department of General Services, Sacramento Regional Flood Control Agency and confidential client. *Sacramento, California*.

Groundwater Modeling and Conceptual Design. Project manager and principal hydrogeologist for the Mather AFB Superfund Site Groundwater Operable Unit. Developed and implemented a program of numerical flow and transport groundwater modeling, conceptual engineering design and cost estimating to select a protective, minimum present-worth design from a range of possible groundwater treatment system configurations. The key component of the approach was evaluation of a range of extraction and injection scenarios using analytical and three-dimensional groundwater flow (MODFLOW) and transport (MT3D) modeling of a multiple aquifer system spanning the Laguna and Mehrten Formations. The models

included an extensive public supply well field and predicted the effect of groundwater withdrawals on contaminant transport to the wells. *AFCEE, Sacramento, California.*

Remedial Investigation/Feasibility Study. Hydrogeologist for Remedial Investigation/Feasibility Study (RI/FS) of the Laboratory for Energy Related Health Research (LEHR) Superfund Site, Davis, California. Evaluated the degree and extent of nitrate, TDS, hexavalent chromium, and chloroform in the unsaturated zone and groundwater. Evaluated records of historical operations and chemical analytical results for unsaturated zone soils to assess potential sources of contamination. Evaluated hydrogeologic information, chemical analytical results for groundwater, and fate and transport processes to delineate the degree and extent of groundwater contamination. Evaluated neighboring supply wells for potential impacts. The information developed was used to assess the effectiveness of remediation approaches, and to plan additional investigations and new groundwater remediation approaches that would be compliant with California Regional Water Quality Control Board, Central Valley Region Waste Discharge Requirements. *University of California, Davis, California.*

Groundwater Flow and Transport Modeling. Project manager for the characterization and remediation of arsenic, copper, and hexavalent chromium at a former wood pressure treating facility. Evaluated the nature and extent of contamination in soil and groundwater, established background concentrations, developed remediation approaches, and managed design efforts. Conducted flow and transport modeling (MODFLOW and MT3D) to support evaluation and modification of the groundwater treatment plant. Evaluated a variety of scenarios to minimize the volume of treated water injected into the aquifer. Evaluation of the hypothetical modifications allowed the client and the Regional Board to make risk management decisions regarding the overall water balance of the site, plume capture, chemical processes applied at the treatment plant and discharge options for the treated effluent. *Confidential client, Merced, California.*

PCB Transport Modeling. Evaluated transport of PCBs in the vadose zone and groundwater. Performed vadose zone and groundwater flow and transport modeling to assess the potential for PCB transport from contaminated soil to groundwater production wells in the vicinity. Performed research on PCB transport properties for use in the modeling effort and presented the results to the California Department of Toxic Substances Control. *Confidential client, Pico Rivera, California.*

Benzene Transport Modeling. Evaluated benzene transport in the vadose zone. Developed a vadose zone model to simulate the effects of precipitation, surface runoff, evapotranspiration, infiltration to groundwater and gas phase diffusion on the transport of benzene to a deep aquifer used for water supply. Used time-dependant site-specific weather information and site- and chemical-specific transport parameters to develop the model. *Confidential client, Carson, California.*

Unocal (Former PureGro) Fertilizer Facility. Project manager for the investigation and remediation of ammonia, nitrate, and organochlorine pesticides in soil and groundwater. Investigated the nature, degree, and extent of contamination and submitted compliance reports to the California Regional Water Quality Control Board, Central Valley Region. Established background concentrations in groundwater. Performed a survey of neighboring supply wells, assessed the potential for impacts, and sampled susceptible wells. Evaluated and estimated capital costs for corrective action. *Walnut Grove, California.*

Radiological Site Characterization. Designed and implemented a statistical sampling approach that was used to assess the degree and extent of reactor-generated radionuclides in the environment, including Humboldt Bay. The results of the characterization were used as part of the basis for estimating the cost of decontamination and decommissioning of the nuclear power plant. At the conclusion of the study it was possible to distinguish between areas likely to require remediation, areas that were affected by plant operations but were unlikely to require remediation, and areas in which no effects were measurable. *PG&E, Eureka, California.*

Hydrogeologic and Modeling Consulting Services. Project hydrogeologist and manager responsible for evaluation of the American River Study Area (ARSA) hydrogeology and contaminant plumes, development of a conceptual site model for the hydrogeologic system, and conversion of the conceptual site model into numeric form to be used in numerical fate and transport modeling. The purpose of the effort was to assess the effectiveness of extraction wells in capturing contaminants and removing them from the groundwater system. Ken managed a project team that worked with staff at Laurence Livermore National Laboratory (LLNL) under a Cooperative Research and Development Agreement (CRADA). The project team reviewed well logs and other subsurface information, water level data, and analytical results to develop a conceptual site model that was consistent with the mapped geology of the area and which explained the distribution and transport of the contaminants in the groundwater system. The conceptual site model was converted to a three dimensional numeric form using geostatistical techniques. The three dimensional conceptual site model was to be used by LLNL staff in their PARFLOW groundwater flow and transport model; however, the project was terminated for budgetary reasons.

Recycled Water Study. Evaluated the use of recycled water generated by the Sacramento Regional Wastewater Treatment Plant. Developed a projected water balance to the year 2030 for Sacramento County to assess potential changes in surface water and groundwater supply with and without the use of recycled water. Evaluated how the changes in supply might affect net surface water flows and groundwater elevations under climate conditions ranging from wet to critically dry. Evaluated the projected cost of recycled water relative to the cost of other water supplies, which included the projected costs of increasingly stringent treatment requirements. Identified and evaluated options for the best use of recycled water. Options included stabilization of groundwater elevations in high demand areas, areas critical for maintenance of instream flows, and areas in which groundwater quality could potentially be improved. *Sacramento Regional County Sanitation District, Sacramento, California.*

Wastewater Treatment Plant Groundwater Investigation. Principal hydrogeologist for evaluation of potential groundwater impacts at the City of Lodi's White Slough Pollution Control Facility. The primary goal of this ongoing effort is to determine whether facility operations and land application of treated effluent and biosolids have impacted groundwater relative to background conditions. A major challenge of the project was to establish these background conditions. Land use in the area includes intensive agricultural and dairy operations, which have affected water quality. Ken evaluated land and water use information and existing groundwater quality in the region to develop the basis for defining background conditions. He evaluated potential sources of contamination and waste streams at the facility, site-specific hydrogeologic conditions and groundwater quality to prioritize potential sources of groundwater contamination and identified groundwater transport pathways and

seepage rates. Results of the study will be used to determine whether improved treatment and control measures are needed. *City of Lodi, California.*

City of Davis Wastewater Treatment Plant Groundwater Monitoring and Reporting Program and Reuse Evaluation. Project manager for assessment of background groundwater quality, comparison of site and background groundwater quality, and development of continuing investigations of background groundwater quality. Principal hydrogeologist for the evaluation of potential wastewater reuse options, including evaluation of reuse areas and storage sites. This ongoing effort involves evaluation of regional groundwater quality to assess the effects of predevelopment environmental conditions and current land use on groundwater quality. Site data have been evaluated with respect to background conditions and water quality goals, and plans for further, more detailed spatial analysis of background groundwater quality are being developed. These plans include evaluation of baseline groundwater quality and geophysical conditions in the potential reuse areas. The work is being conducted to meet Central Valley Regional Water Quality Control Board requirements and schedules. *City of Davis, California.*

Flag City Wastewater Treatment Plant Groundwater Monitoring and Reporting Program. Principal Hydrogeologist responsible for quarterly and annual groundwater reporting. Prepared quarterly and annual reports using monitoring data collected by San Joaquin County. Developed and implemented the background groundwater monitoring program. Used nonparametric statistics to compare background and site groundwater data. Compared site groundwater data to published water quality goals. Negotiated with Regional Board staff to develop and implement clean closure approach for the effluent storage ponds after use of the wastewater treatment plant was discontinued in summer 2008. *County of San Joaquin, San Joaquin County, California.*

Wastewater Facilities Assessments for the California Department of Corrections and Rehabilitation. Principal hydrogeologist during evaluation of wastewater facilities at correctional facilities in a wide range of geologic environments. Assessed groundwater conditions, and potential groundwater quality impacts with respect to Regional Water Quality Control Board Waste Discharge Requirements. Assessed groundwater/surface water interactions with respect to recent court decisions and Regional Board permit actions. Evaluated alternative disposal options, including reuse. Prepared reports documenting findings and recommended action plans. Various sites. *California Department of Corrections and Rehabilitation, Sacramento, California.*

City of Galt Wastewater Treatment Plant Groundwater Investigation. Project manager for the City's Groundwater Monitoring and Reporting Program. The program addresses the wastewater treatment facilities and the surrounding lands, which are irrigated with plant effluent and used for biosolids disposal. Initiated the program by negotiating with the California Regional Water Quality Control Board, Central Valley Region, and developing the work plan defining well locations, analytical parameters, monitoring protocols, and schedule. No revisions to the work plan were required after the subsequent issuance of Waste Discharge Requirements. Analytical parameters include ammonia, nitrate, coliform, and metals. Established background monitoring locations that have been accepted by the Regional Board. Plant operations result in year-round mounding of groundwater, making placement of upgradient background wells impractical. Instead, background well locations were selected based on groundwater transport and land use considerations. Evaluated the potential for impacts to neighboring supply wells; used nonparametric statistical

methods to evaluate whether the monitored constituents exceeded background concentrations. *City of Galt, California.*

Mountain House Wastewater Treatment Plant Pond Evaluation. Hydrogeologist for the evaluation of secondary treated effluent storage ponds. Leakage was observed shortly after the ponds were constructed. Ken evaluated as-built geotechnical data, groundwater quality data and groundwater modeling results to assess the potential future impacts of leakage; the likelihood that newly constructed ponds would meet California Regional Water Quality Control Board, Central Valley Region Waste Discharge Requirements; and potential remedial solutions. Results of the evaluation led to lining of the ponds. *San Joaquin County, California.*

STATE OF CALIFORNIA

Energy Resources Conservation
and Development Commission

Application for Certification for the IVANPAH SOLAR ELECTRIC GENERATING SYSTEM	))))	Docket No. 07-AFC-5

PROOF OF SERVICE

I, Karen A. Mitchell, declare that on January 8, 2010, I served the attached *Applicant's Witness List and Resume of West Yost – Ken Loy* via electronic mail and United States Mail to all parties on the attached service list.

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

Karen A. Mitchell

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
FOR THE *IVANPAH SOLAR ELECTRIC GENERATING SYSTEM*

DOCKET NO. 07-AFC-5
PROOF OF SERVICE
(Revised 11/23/09)

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

Todd A. Stewart, Project Manager
Ivanpah SEGS
sdeyoung@brightsourceenergy.com
E-mail Preferred

Steve De Young, Project Manager
Ivanpah SEGS.
1999 Harrison Street, Ste. 2150
Oakland, CA 94612
tstewart@brightsourceenergy.com

APPLICANT'S CONSULTANTS
John L. Carrier, J. D.
2485 Natomas Park Dr. #600
Sacramento, CA 95833-2937
jcarrier@ch2m.com

COUNSEL FOR APPLICANT

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

INTERESTED AGENCIES
California ISO
e-recipient@caiso.com

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

*indicates change

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

Becky Jones
California Department of
Fish & Game
36431 41st Street East
Palmdale, CA 93552
dfgpalm@adelphia.net

INTERVENORS

California Unions for Reliable Energy ("CURE")
Tanya A. Gulesserian
Marc D. Joseph
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Ste 1000
South San Francisco, CA 94080
tgulesserian@adamsbroadwell.com

Western Watersheds Project
Michael J. Connor, Ph.D.
P.O. Box 2364
Reseda, CA 91337-2364
mjconnor@westernwatersheds.org

Gloria Smith, Joanne Spalding
Sidney Silliman, Devorah Ancel
Sierra Club
85 Second Street, 2nd Fl.
San Francisco, CA 94105
E-mail Service Preferred
gloria.smith@sierraclub.org
joanne.spalding@sierraclub.org
gssilliman@csupomona.edu
devorah.ancel@sierraclub.org

INTERVENORS CONT.
Joshua Basofin, CA Rep.
Defenders of Wildlife
1303 J Street, Ste. 270
Sacramento, CA 95814
E-mail Service Preferred
HHjbasofin@defenders.orgHH

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

Center for Biological Diversity
Lisa T. Belenky, Sr. Attorney
Ileene Anderson, Public Lands Desert Director
351 California Street, Ste. 600
San Francisco, CA 94104
E-mail Service Preferred
lbelenky@biologicaldiversity.org
ianderson@biologicaldiversity.org

California Native Plant Society
Greg Suba, Tara Hansen & Jim Andre
2707 K Street, Suite 1
Sacramento, California, 95816-5113
E-mail Service Preferred
gsuba@cnps.org
thansen@cnps.org
granites@telis.org

***County of San Bernardino**
385 N. Arrowhead Avenue, 4th Fl.
San Bernardino, California, 92415
bbrizzee@cc.sbcounty.gov

Bart W. Brizzee, Deputy Co. Counsel
ENERGY COMMISSION
JEFFREY D. BYRON
Commissioner and Presiding Member
jbyron@energy.state.ca.us

JAMES D. BOYD
Vice Chairman and
Associate Member
HHjboyd@energy.state.ca.usHH

Paul Kramer
Hearing Officer
pkramer@energy.state.ca.us

John Kessler
Project Manager
jkessler@energy.state.ca.us

Dick Ratliff
Staff Counsel
dratliff@energy.state.ca.us

Public Adviser
publicadviser@energy.state.ca.us

*indicates change