

DOCKETED

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JIM MCLUCAS

CURRENT POSITION

Senior Vice President, Engineering for Radback Energy, a startup energy company focusing on the development of large-scale natural gas-fired and renewable energy projects throughout the Western United States.

EDUCATION

1977 - 1981 University of California Santa Barbara, California

B.S. Mechanical Engineering

- Graduated with High Honors
- Member, Tau Beta Pi and Pi Tau Sigma Honors Engineering Societies
- Recipient, President's Undergraduate Fellowship
- Recipient, University of California Appropriate Technology Grant

PROFESSIONAL REGISTRATION

Mechanical Engineer

California, M23815

EXPERIENCE

2007 – Present Radback Energy

Danville, California

Senior Vice President, Engineering

- Responsible for all engineering needs in the support of the development of energy projects, including cycle design and performance, site layouts, equipment procurement, transmission interconnection, gas supply, water supply, wastewater disposal, emissions, construction cost estimates, and scheduling.

2007 – Third Planet Windpower

San Ramon, California

Director of Engineering

- Responsible for all technical aspects associated with wind energy development including wind resource analyses, wind turbine technical requirements, performance estimates, development support engineering, transmission, and wind farm design.

Senior Project Developer

- Responsible for the development of new large-scale wind projects including a 500 MW wind farm near Gladstone, NM.

2000 – 2007 Calpine Corporation

Pittsburg, California

Manager of Water Technology and Chemical Operations

- Responsible for overseeing Calpine's water treatment specialists, providing operational assistance to plants nation-wide, supporting ongoing development efforts, and design and specification of new water and wastewater treatment systems, chemical storage and feed facilities, and water chemistry sampling

and monitoring systems for new construction.

Regional Engineering Manager

- Regional Engineering Manager in Calpine's Western Region office, responsible for engineering assistance to support the development and permitting of new power projects. Responsibilities included plant sizing, cycle configuration, site layouts, water balances, emissions calculations, interfacing with Calpine's thermal engineering, plant engineering, environmental, construction, asset management, finance, and operations groups, preparation of Applications for Certification, Environmental Impact Statements/Reports, written and verbal testimony to the CEC, technical interface with gas, electric, water, and wastewater utilities and state and local agencies, coordinating site geotechnical investigations and surveys, and preparation of project-specific plant design guidelines providing the basis for the detailed design.

Energy Experience

- Project engineer for the development of the Inland Empire Energy Center (IEEC), originally configured as a 670 MW 2x1 combined cycle power plant using General Electric (GE) 7FB combustion turbines. GE later purchased this project and the CEC license and air permit were amended to allow the IEEC to be GE's North American launch site for their state-of-the-art "H" technology combined cycled units. The project is now an 800 MW facility incorporating two of GE's "H" units. Responsibilities included development, engineering, and permitting support for both the original licensing and amendments, negotiation of eight contracts for the supply for potable water, raw water, and recycled water, and the disposal of sanitary and process wastewater. Performed engineering management, under services being provided by Calpine Power Services, for the design of the various project linear facilities, including those for potable water, raw water, recycled water, sanitary sewer, non-reclaimable wastewater, transmission, natural gas, and various road improvements.
- Project engineer for the development of Calpine's Russell City Energy Center, a 620 MW 2x1 combined cycle power plant using Siemens Westinghouse 501FD combustion turbines, to be located in Hayward, California.
- Provided project engineering supporting the development of the following additional Calpine projects, which have not moved forward:
 - East Altamont Energy Center, a 3x1 1000 MW project located in eastern Alameda County
 - Moapa Paiute Energy Center, a 3x1 1000 MW project located northeast of Las Vegas, Nevada
 - Teayawa Energy Center, a 2x1 600 MW project located near Coachella, California
 - Turner Energy Center, a 2x1 620 MW project located in Turner, Oregon
- Under Calpine Power Services, functioned as the project engineer supporting the development and permitting of Turlock Irrigation District's Walnut Energy Center, a 250 MW 2x1 combined cycle power plant using GE 7EA combustion turbines. Duties during the construction of this facility included preparation of specifications and bid evaluations for cooling tower and boiler chemical feed systems, water/steam sampling systems, and the zero-liquid

discharge system.

- Under Calpine Power Services, functioned as the project engineer supporting the development and permitting of the City of Roseville's Roseville Energy Park, a 160 MW 2x1 combined cycle power plant using Alstom GTX 100 combustion turbines.

1988 – 2000 CH2M HILL

Oakland, California

1981 – 1985

Senior Project Manager

- Senior project manager, mechanical engineer, and project delivery coordinator in CH2M HILL's Water Business Group. Experience includes preliminary and detailed designs, preparation of specifications and drawings, equipment selection, system optimization, economic analyses, feasibility studies, computer analyses, cost estimating, value engineering, construction management, field inspection, permitting, and startup for water and wastewater treatment plants and energy projects for both industrial and municipal clients.

Water/Wastewater Experience

- Staff engineer overseeing the design of a Title 22 Recycled Water Facility (RWF) for Calpine Corporation. The RWF, located at Delta Diablo Sanitation District's wastewater treatment plant, provides recycled water for Calpine's Delta Energy Center and Los Medanos Energy Center, both located in Pittsburg, California. This facility was designed and constructed on a fast-track basis with major equipment pre-purchased, and multiple engineering and construction contracts. Responsibilities also included assistance with contract negotiations and coordination with the raw water and wastewater utilities.
- Project manager, lead mechanical engineer, and startup engineer for the Monterey Regional Water Pollution Control Agency's Salinas Valley Reclamation Project (SVRP), a 38.5-mgd Title 22 water reclamation plant, the effluent of which is used to irrigate unprocessed food crops. Constructed facilities include an influent pump station, coagulation/flocculation structure, dual media filters, chlorine contact basins, backwash equalization basin and clarifier, chemical building, chlorination building, reclaimed water storage pond, and reclaimed water distribution pipelines including two directionally drilled river crossings. Responsibilities also included managing SCADA system development and programming effort, preparation of portions of the plant operations manual, and training of the operations and maintenance personnel.
- Lead engineer on the design of Contra Costa Water District's Multipurpose Pipeline project involving a new 20-mile, 42-inch pipeline and pump station to convey treated water from the District's Randall Bold Water Treatment Plant to their treated water service area.
- Lead mechanical and I&C engineer for the preliminary design of ozonation facilities for five of EBMUD's filter plants. Responsibilities included development and preparation of purchase documents, including specifications and process and instrumentation diagrams (P&IDs) for ozone system equipment. Lead mechanical engineer during final design of ozonation facilities, chemical systems, and filtration improvements at two of the filter plants. Field project engineer during the construction phase of these two

projects, with technical responsibilities including submittal review, preparation of clarifications and change orders, startup and testing, SCADA system programming, preparation of the operations manual, and training.

- Project manager, lead mechanical, and startup engineer for the design and construction of the Paralta Well Ozone Treatment Project for the California-American Water Company in Seaside, California. The facility includes in-line injection of ozone for the oxidation of sulfide and chemical storage and feed systems for zinc orthophosphate and sodium hypochlorite.
- Other ozonation experience includes senior consultant roles on ozonation projects for Palm Beach County Water Utility Department's Water Treatment Plant 2W; the City of Valdosta, Georgia's, Water Treatment Plant; Tulsa, Oklahoma's, A.B. Jewell Water Treatment Plant, and peer review responsibilities for Contra Costa Water District's Bollman Water Treatment Plant ozonation project.
- Project manager for the design of the City of San Jose's 145-cfs Old Oakland Road Stormwater Pump Station. Responsibilities include the design of the new pump station and outfall, coordination with utilities, permitting (RWQCB, Corps of Engineers, California Department of Fish & Game, and SCVWD), and engineering services during bidding and construction.
- Project manager and lead mechanical engineer for the design of a Site Chemical and Industrial Waste System Upgrade project for IBM in San Jose, California, involving the design of new double-contained piping and leak detection systems for approximately 40,000 lineal feet of piping for industrial waste, heavy metal waste, scrubber waste, brine waste, and fuel oil piping systems to comply with Title 40 CFR regulations.
- Lead mechanical engineer for the design of dechlorination facilities at Hayward Marsh for Union Sanitary District. The dechlorination facilities include bulk chemical storage tanks, chemical metering equipment, secondary containment, and controls systems for injecting and mixing sodium bisulfite into the effluent for dechlorination purposes.
- Lead mechanical engineer for the design of a pump station and reservoir to provide potable water and fire protection water for the City of Redwood City. Responsibilities included a computer network analysis of the water distribution system.
- Project manager and lead mechanical engineer for the design of modifications at the San Jose/Santa Clara Water Pollution Control Plant to comply with the City of San Jose's Toxic Gas Ordinance. The modifications included new double-contained piping systems for the unloading and handling of chlorine and sulfur dioxide, leak detection equipment, a chlorine and sulfur dioxide scrubber system, and a PLC-based controls system for automated response to chlorine and sulfur dioxide leaks.

Energy Experience

- Staff mechanical engineer for the design of the 14.7-MW SEGS-1 Solar Electric Generating Station located in the Mojave Desert near Barstow, California. This project, designed for Atkinson Mechanical Contractors, included 560 parabolic solar collectors heating oil to 600 degrees F, which, in turn, was used to generate steam for the production of electricity through a simple cycle. Responsibilities included assisting in the preparation of the power block contract, design of various balance-of-plant systems, piping

stress analysis, and preparation of the plant operations manual.

- Project manager and lead mechanical engineer for the design of a cogeneration facility consisting of two 650-kW ebulliently-cooled reciprocating engine generators, a 400-ton absorption chiller, and a 600-ton centrifugal chiller providing electricity, steam, chilled water, and hot water for an electronics plant for Burroughs Corporation.
- Staff mechanical engineer responsible for conceptualization and detailed design of a medium Btu gas collection, compression, blending, and delivery system including four reciprocating gas compressors, an 86,000-cf low-pressure gas holder, and a 10-million cf/day flare system constructed as part of a 5.5-MW energy recovery system expansion at the San Jose/Santa Clara Water Pollution Control Plant.
- Project manager for the rehabilitation of existing 3.5-MW reciprocating engine generator and 12,600-hp reciprocating engine blower facilities at the San Jose/Santa Clara Water Pollution Control Plant.
- Other cogeneration experience includes a feasibility study for Mobil Chemical, Bakersfield, California and the feasibility study and preliminary design of an incinerator waste heat recovery system including a 1-MW condensing steam turbine generator for the City of Palo Alto, California. The Palo Alto study was later revised to include a reciprocating engine generator facility to use landfill gas produced nearby.

1985 – 1988 Power Projects, Incorporated Walnut Creek, California

Lead Senior Engineer

- Lead mechanical engineer from the initial development through final acceptance of two 28-MW combined cycle turnkey cogeneration projects for O.L.S Energy. Responsibilities included process design, development of P&IDs, preparation of equipment and subcontract specifications, bid evaluations, review of vendor submittals, construction support, and startup coordination. Responsibilities also included the negotiation and coordination with the water, wastewater, and natural gas utilities for each project. Both projects were engineered and constructed simultaneously on a "fast track" schedule with the initial startup of the facilities within 16 months after close of financing.