POWERPLANT Consultants, Inc. &
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CURRICULUM VITAE

CHRISTOPHER K LANE, P.E.

Education and Certification:

M. S. Nuclear Physics - Naval Postgraduate School, Monterey, CA, 1972.
B. S. Physics - Oregon State University, Corvallis, OR, 1971.
Graduate Studies in Systems Management, Univ. of So. Calif.
Registered Professional Engineer - Mech., CA(22192)/AZ(27683).
Licensed Engineering Contractor (A-Haz); California (413866/503465).
Graduate Naval Nuclear Power Program for Officers 1972
Completed Turbine Fuel Delivery Systems short course, ATUA, October 2002
Private Pilot – Single Engine Land 1985

Publications:

"Parametric Fuel Metering For Liquid Fueled Combustion Turbines and Diesel Engines"; Electrical Generating Systems Association, supplemental articles for Annual Meeting Proceedings (finalized 9/30/02 for issue with meeting proceedings December 2002).

"Finite-Amplitude Standing Waves in a Rigid-Walled Cavity", Thesis (M.S. Physics) -- Naval Postgraduate School (NPS), Monterey, California, 1972. NPS Library locator L2568; Reference code AD747522.

USS Thomas A. Edison SSBN-610 Ship's Information Book (SIB) and Training Aid Booklet (TAB) set, Revision 2, 1974; Comprehensive revision of 14 volume set of information and training manuals associated with general ship upgrades and major modifications including new reactor plant, new sonar/radar/visual sensor systems, new torpedo and missile launch and fire control systems, SubSafe flooding prevention and recovery upgrades, and other navigation, communications engineering and ship's control changes performed during 15-month major refueling overhaul. Published by U.S. Navy for internal Navy use only with classification "Confidential".

Patents & Inventions:

"High performance coolant system with manifold for large diesel engines", U.S. Patent # 5,337,705 (August 16, 1994).

"Keyed Split Ring Gear" for large diesel engines, patent disclosure filing submitted, patent application in process.

"Parametric Fuel Metering for Liquid Fueled Industrial Gas Turbines and Diesel Engines"; patent disclosure filed and rights preserved but no formal application yet filed nor anticipated due to lack of commercial value.

Inventor for unique application using waste heat from combustion turbine effluent oil for heating influent raw field gas (methane) to add superheat to water saturated gas supply. (No patent filed)

Expert Witness Reports, Depositions & Testimony:

Resource Technology Corporation vs. Connecticut Resources Recovery Authority (Case 99-35434) United States District Court Northern District of Illinois – Eastern Division; Expert report and testimony concerning energy conversion aspects of a two unit, 1,730 kW, landfill gas project in Shelton, Connecticut, 2002.

Strategic Resource Solutions, Inc. versus San Francisco Unified School District, et al; Investigation and analysis of boiler failures and furnace explosion, June 2002 to present.

Electrical systems duty cycle review, analysis and expert report for a wood processing plant in Washington State for plaintiff's attorneys Ball & Janik (parties not named); 2001.

Kenetech Corporation versus General Motors Corporation (dba Allison Gas Turbine) Re: Hartford Hospital Cogeneration Project, Hartford, Connecticut; 1996 to 1997.

Varnsdorf Pty. Ltd. versus Fletcher Construction Australia Ltd. Commercial arbitration proceedings Re: Victorian Hospital Cogeneration Projects, Melbourne, Australia; 1998 to 2001.

Professional Experience:

o 1984 - Present Generation Equipment Services Co. (POWERPLANT Consultants, Inc.)

Consultant and expert witness for technical and economic investigations, arbitration/litigation, due diligence reviews and contractual disputes involving with industrial power generation, cogeneration, standby emergency power units, emergency diesel generators, gas turbine generation systems and other energy conversion processes. Special emphasis in waste-to-energy and other special fuels including landfill gas, digester gas, raw field gas, refinery off-gas, and other fuels as applied to energy recovery projects.

International experience including extended assignment in Australia as principal expert for family of large multinational insurance and financial services companies (recruited for this position by and worked through R.W. Beck on this multi-year, $100 million project dispute). Projects where served in this capacity include Hartford Hospital (Hartford, CT), Victorian Hospitals (Melbourne, Australia), Hyperion Waste to Energy Project (City of Los Angeles), Vernon Municipal (Vernon, CA) and others. Energy rate (gas and electric) analyst for utility deregulation related rate restructuring and contract negotiations for major energy-intensive facilities.

President and owner of GESCO/PCI providing specialized technical services to the industrial power generation industry with special emphasis in critical use facilities such as data centers, telephone switching centers and hospitals as well as small utility power projects. Also provide highly specialized analytical services relating to plant performance. Particular expertise for projects involving Allison gas turbines in standby power and cogeneration applications, and for stationary power generation with ElectroMotive Diesels.

Consulting engineering, field maintenance and modifications, and contract project management for a wide range of conventional and alternative fuel projects including large emergency standby, base load and peaking cogeneration projects and a variety of specialty fueled projects including digester gas, landfill gas, methanol, municipal solid waste, geothermal and others. Special emphasis on power plant startup, O&M, construction supervision, plant performance testing & evaluation, and special system commissioning. Particular focus on process controls and fuel processing/safety systems and related controls for industrial engines and boilers.

Project Manager and Startup Engineer for the City of Los Angeles digester gas fueled 20,000 kilowatt Hyperion Energy Recovery Project Cogeneration Plant. Responsible for all aspects of equipment installation and startup/performance testing for this $12 million project. Equipment includes four Allison 570-KA gas turbine

generators with HP/LP heat recovery steam generators, selective catalysts and numerous auxiliaries including digester gas treatment and digester gas/natural gas fuel controls. This project involved extensive technology development work on various fuel processing, energy conversion, heat recovery and other aspects of this, the world's largest waste to energy plant involving use of municipal digester gas.

Startup Engineer for International Power Technology, Inc. Conducted startup for three 6MW gas turbine cogeneration units at two sites, each with Allison 501-KH steam injected gas turbines and supplementary fired heat recovery steam generators operating in a "Cheng Cycle". Responsible for integrated plant testing, performance verification and demonstration, development of operating and casualty procedures and conduct of operator training program. Programmed Bailey Network 90 control system operator interface graphic displays. Startup Test Engineer for development of Factory and Field Acceptance Test Program and other documentation for an Allison 501 based 6 MW Cogeneration Project in Bakersfield, California. Various follow-on contracts for graphic display programming for "Standard" plant design, and customizing standard graphics for new projects, plant design/performance improvement reviews, technical document reviews and general technical consulting.

Project Manager and Principal Engineer for geothermal drilling/testing and power plant development project for Imperial Energy Corporation. Supervised design, drilling, completion and testing of an 8500' high temperature geothermal production well in the Imperial Valley, California. Developed conceptual design for modular 3MW steam power plant. Processed all permits for project drilling, construction, operation and testing. Formulated development plan for project expansion to 16MW including utility interconnection and power sales agreements.

Inventor for a high performance cooling manifold design for use on Electro-Motive Diesel engines in the 3,600 to 4,800 HP range. This invention, covered by Patent (U.S. 5,337,705), improved oil cooling by 30% to 70% and is now in use by the U.S. Navy and at other "arduous" applications in Australia and Alaska. Inventor of a portable precision computer room environmental monitoring station for 3-D modeling of critical environment in large computer center main processing rooms.

o 1979 - 1984 WESTEC Services, Inc.

Deputy Manager for Energy Division responsible for supervision of both Engineering and Contract Operations & Maintenance groups which included fifteen engineers and eighty power plant operations and maintenance technicians. Project Manager for numerous cogeneration and geothermal consulting contracts as well as for field operations and testing projects involving geothermal wells and both geothermal and cogeneration power plants. Directly involved in the development of operating procedures and station orders for both utility and non-utility power generating stations. Also responsible for formulation and execution of Strategic Marketing Program.

Three digester gas projects of note included (1) feasibility analysis and conceptual design for a feed lot digester system in Brawley, CA; (2) Plant operation of a large 2.5MW digester fueled reciprocating engine plant for the City of San Diego at their Pt. Loma Waste Water Treatment Plant, and (3) system design, design optimization, air permit screening and various other technical support activities for the City of Simi Valley digester gas fueled power plant development program.

o 1977 - 1979 Bechtel Power Corporation

Nuclear Licensing Engineer and Safety Design Review Coordinator for $3.5 billion nuclear power plant project in Georgia. Responsible for conduct of formal design review program for plant process systems (Mechanical, electrical and controls) to assure compliance with applicable regulations and to verify that each system would meet its design criteria. Principal liaison between client utility licensing and operations management and Bechtel Power Corporation. Chaired all Licensing Review Meetings whose participants included A/E and utility Vice Presidents, Chief Engineers and Program Managers.

o 1971 - 1977 United States Navy

Submarine Officer serving on the USS Thomas A. Edison SSBN-610, a nuclear powered Fleet Ballistic Missile

submarine. Principal duties as Engineering Division Officer in billets as Main Propulsion Asst. and Damage Control Asst., with temporary assignment as Communications Officer. Qualified in all possible watch stations including Engineering Officer of the Watch, Engineering Duty Officer, Ship's Diving Officer, Torpedo Fire Control Supervisor, Officer of the Deck, and Ship's Duty Officer. Provisional qualification as Command Duty Officer. Special expertise in ship control resulted in assignment of Junior Officer training responsibilities normally reserved for more experienced, senior officers. Authored major revision to Ship's Information Book (14 Vol.) and Training Aid Book and implemented SUBSAFE Program for first ship in class. Directed several special maintenance programs including nuclear plant primary resin replacement, high-power reactor testing, and turbine generator replacement.

Memberships:

American Society of Mechanical Engineers, Electrical Generating Systems Association, Instrument Society of America, UL Code Committee Member for Standby Power Equipment (UL-2200) (1997 to 1999) and Ad-Hoc Committee for development of Distributed Generation Systems Performance Standards (2002), National Society of Professional Engineers, Sigma Pi Sigma (National Physics Honor Society 1971).