

CURRICULUM VITAE

CHRISTOPHER K LANE, P.E.
3219-263rd CT SE, Sammamish, WA 98075

Education and Certification:

M. S. Nuclear Physics - Naval Postgraduate School, Monterey, CA, 1972.
B. S. Physics - Oregon State University, Corvallis, OR, 1971 (with honors)
Graduate Studies in Systems Management, Univ. of So. Calif.
Registered Professional Engineer - Mech., CA(22192)/AZ(27683)/WA(41575)
Licensed Engineering Contractor (A-Haz); California (413866/503465) (Inactive as of 2016).
Graduate Naval Nuclear Power Program for Officers 1973
GE Programmable Controls – Applications & Programming Course, 1998
Completed Turbine Fuel Delivery Systems short course, ATUA, October 2002
Factory Training -Turbec (Volvo-ABB) Microturbine Application, Installation & Service – 2003
NFPA-85 Boiler-Burner Management Code Compliance Course, Inst. Society of Am. (ISA) – 2003
OSHA Certified Training – Lockout/Tagout & Control of Hazardous Energy (29CFR 1910.147) – 2008
OSHA Certified Training – OSHA 10-Hour Construction Safety (29CFR 1926) (Cert.001901774)-2008
NSPE Engineering Ethics and the Law: The PE as an Expert Witness online course 2009
Suncam Practical Forensic Engineering Continuing Education Courses Parts 1 & 2 (8 CEU) – 2020
Suncam Forensic Engineering – Metallurgical Failures Parts A, B & C (10 CEU) - 2020
Suncam Asbestos Fundamentals Continuing Education Course (4 CEU) - 2020
US Transportation Worker Identification Credential as required by USDHS
Private Pilot – Single Engine Land 1985 (Licensed but inactive)

Memberships & Committees:

American Society of Mechanical Engineers (ASME), , National Society of Professional Engineers (NSPE), Member & Board Member/Treasurer Washington Society of Professional Engineers (2019-2020), Society of Naval Architects & Marine Engineers (SNAME); Sigma Pi Sigma (National Physics Honor Society 1971); SNAME Committee Member for Naval Architect & Marine Engineer Professional Registration Examination Review & Validation (2008 - 2019), UL Code Committee Member for Standby Power Equipment (UL-2200) (1997 to 1999) and Member, UL Standards Technical Panel STP 2200 for development of Stationary Engine Generator Assemblies Standard Number 2200 (2003-2015)

Propulsion Systems Integration Contractor for Commercial Ferry Vessels:

Power plant and marine propulsion systems integration expert. From May 2005 through September 2018, Project Manager, Engineering Liaison and Engineer of Record as Propulsion Systems Integrator for the \$80 million Propulsion Systems Integration Contract involving four large 144 car/1500 passenger “Olympic Class” commercial ferries in Puget Sound/Seattle, WA. Under a subcontract to Valley Power Systems, Inc., serve as the Propulsion Systems Integration Contractor to the Washington State Department of Transportation, Washington State Ferries (WSF). Vessels in this project include Tokitae, Samish, Chimacum and Suquamish.

This work involved management of both technical and commercial aspects of the propulsion system contract and extensive personal involvement in system design, design reviews, testing, training, oversight of construction/installation of propulsion systems and the preparation and processing of USCG Marine Safety Center and other submittals including Qualitative Failure Analyses (QFA), Periodic Safety Test Procedures (PSTP) and Failure Modes and Effects Analyses (FMEA).

Also provided support for main engine and engine controls on vessels Chetzemoka, Salish and Kennewick. Also have been involved with propulsion systems work for Alaska Marine Highways vessels Testumena and Aurora, as well as for commercial processing vessels Northern Victor (Icicle Seafoods) and Seattle Enterprise and Eastern Wind (Trident Seafoods).



Figure 1 - M/V Samish, 3rd Olympic Class Ferry, underway at new construction sea trials

Expert witness work on cases focused on power plant and marine propulsion technical and financial performance issues, investigation of major accidents & major machinery failures, assessment of designs and duty of care for design, application of lockout/tag-out and related safety regulations and work characterization for shipyard. Addition experience on litigation cases involving industrial, shipyard and U.S. Navy personnel who have contracted mesothelioma or other asbestos related ailments. Special experience in power plant systems integration including mechanical, electrical and controls systems and human aspects of operations, maintenance, training and safety.

Consultant and expert witness for technical and economic investigations, arbitration/litigation, due diligence reviews, contract and rate disputes involving with industrial power generation, cogeneration, standby emergency power units, continuous duty and emergency diesel generators. Emphasis in industrial sized cogeneration, combined cycles and 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. Engines and turbines involved in marine propulsion and stationary power projects have included a very wide range including EMD, GE (recips and both gas and steam turbines), Caterpillar, Cooper-Superior, ALCO, Enterprise, Mitsui, Waukesha, Pratt & Whitney, Turbec (Volvo-ABB) Cummins, Deutz, Allison, Solar, Yanmar, Perkins, Siemens, Mitsubishi (MHI), Fuji, Toshiba, Westinghouse and others.

Consultant to Bank of America and Jones Lang LaSalle (facilities management group) for wide range of engineering, economics and environmental permit matters from 1987 to 2014. Work has included design and installation of complete diesel generator systems (Caterpillar, Detroit Diesel, Perkins, ElectroMotive Diesel, Deutz, John Deere, etc.) major diesel fuel system redesign and upgrades, diesel-hydraulic starter system design, installation and commissioning for new systems, and redesign and upgrade for previously existing systems, numerous control systems upgrades renegotiation of energy service contracts with major utilities and other prospective energy service companies, and for air permit issues for several major onsite generation plants.

International experience including extended assignment in Australia as principal expert for a family of large multinational insurance and financial services companies in a \$100 million project dispute involving cogeneration projects at Victorian Hospitals (Melbourne, Australia). Recent (2017-2018) principal expert for gas turbine controls, emphasizing islanding and inlet cooling for Saudi Aramco International Arbitration case (London) for 3 larger 450MW power systems at major gas processing facilities in Saudi Arabia. Other international projects include International Arbitrations for power projects in Mexico and Korea, hand-on gas turbine modification work in France and equipment inspections in Canada, Norway, Germany and Sweden.

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 dual pressure HP/LP heat recovery steam generators (HRSG), selective catalysts and numerous auxiliaries including digester gas treatment and digester gas/natural gas fuel controls and evaporative inlet air cooling. 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 (HRSG) 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. Programmed and validated computer based economic model for real-time calculation of project performance using mathematical algorithms of Power Purchase Agreement rate structure and actual plant performance data.

Project Manager and Principal Engineer for geothermal drilling/testing and power plant development project for Imperial Energy Corporation. Supervised design, drilling, well completion and testing of an 8500' high temperature geothermal production well in the Imperial Valley, California. Developed 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, power sales agreements and draft pro-formas for venture capitalists and institutional investors.

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.

Project Manager for replacement of 18kV high current main power bushings on main output transformer at NRG El Segundo Unit #3. Direct supervision of transformer bushing replacement, comprehensive transformer testing, oil removal/replacement, cooling pump overhaul & replacements, case refinishing and unit recommissioning. (2004)

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. Project work with Navy Facilities Engineering Command, Public Works Branch for investigation of cogeneration and geothermal power projects at various Navy facilities in California.

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. All three of these projects included detailed economic analysis and modeling of project finances to assess financial feasibility.

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 codes and other regulations, including Nuclear Regulatory Commission regulations and NFPA safety codes, 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 for one patrol as Control Training Officer for new Deck Officer candidates. Qualified in all possible supervisory 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 lacking only advancement in rank to Lt. Commander for final qualification. Extensive shipyard overhaul experience including responsibility for the ship's lockout/tagout safety program, confined space and hot work permitting and for in-port fire, flooding and atmospheric hazards control programs.



Figure 2 - USS Thomas A. Edison SSBN-610 underway

As a Midshipman in the ROTC program at Oregon State University, completed normal 4-year program in 2-years and was selected as “Distinguished Naval Graduate”, a top honor for a graduating ROTC midshipman and offered (and accepted) a “Regular” versus normal “Reserve” commission as Navy Ensign. Completed Midshipman training aboard USS Bonefish (SS580), a diesel electric submarine operating in Hawaiian waters, and the USS Sculpin (SSN590), a nuclear powered attack submarine for transit from Hawaii to San Diego and local operations off the Southern California Coast. Finished near top of class in NROTC and later at the Naval Post-Graduate School (Monterey) and at both Nuclear Power School and Naval Reactor Prototype Training Programs for officers.

Expert Witness and Related Expert Consulting Activities:

The highly technical nature of these cases is such that they typically involve the preparation of one or more reports per case, often involve depositions, and occasionally involve testimony at court or arbitration hearings. Experience included participation as technical expert in several international cases involving tens to hundreds of millions of as measured in US dollars. As a result in the last several years I have testified at deposition and/or formal hearings as follows:

History of testimony at trial, arbitration hearing or deposition:

- 6/1/2020 as deposition witness for Defendant in United States of America v. Land O’Lakes, Inc. et al; U.S. District Court for the Western District of Oklahoma; Case No. 5:16-CV-00170-PRW.
- 3/3/17 as deposition witness for the Defendant in Tri-State Generation and Transmission Inc. et al vs. Mitsubishi International Corporation, et al. U.S. District Court for the District of Arizona; Case No. 3:14-cv-08115-NVW.
- 1/23/17 – 1/25/17 hearing testimony as expert witness for engineering and economic issues for Defendant in Comision Federal de Electricidad (Mexico) v. Energia Azteca VIII S. DE R.L. DE C.V. (an InterGen affiliate); International Arbitration in Mexico City, Mexico.
- 7/8/2016 as expert witness for Batzer Construction, Inc. vs. White Oak Global Advisors LLC and First American Title Insurance Company; Superior Court of California – Shasta County, Case No. 181698.
- 5/12/2015 as witness for Plaintiff Donald J. Robertson vs. Cleaver-Brooks, et al; State of Wisconsin, Milwaukee County, Circuit Court Branch – 42; Case No. 14-CV-732

- 12/3/2014 as witness for the Plaintiff Ellingworth, Collins et al vs. AC and S, Inc. et al; Superior Court of California, County of Alameda – Unlimited Jurisdiction, Case RG11599656
- 10/23/14 as witness for the Defendant Trustee in Angelina County et al vs. Aspen Power et al. District Court of Angelina County, TX, 217th Judicial District. No. TX-186.
- 12/18/13 as witness for the plaintiff in asbestos litigation Arenius vs. Cleaver-Brooks in U.S. District Court, Western District at Seattle Case 2:12-cv-02131-RSL.
- 9/11/2012 as witness at deposition for plaintiff in asbestos litigation Roland L. Stevens and Shirley J. Stevens v. CBS Corporation, et al. U.S. District Court Western District of Washington at Tacoma No. 3:11-CV-06073.
- 12/2/2011 as witness for plaintiff in asbestos litigation Mara Lynn Abbay vs. Armstrong International, Inc. et al, CIVIL ACTION NO. MDL 875, EDPA Case No.: 2:10-cv-83248-ER
- 9/20/2011 as witness for the third party defendant, Source North America/Ace Tank, in ATT Mobility v. Holaday Parks Fabricators v. Evergreen Power Systems and other third party defendants. Case is associated with diesel fuel day tank fill controls and related technical and procedural issues with lockout-tagout related to a spill of some 15,000 gallons of #2 diesel fuel in Bothell, WA.
- 9/8/2011 completed three days of testimony as principal technical expert for the Plaintiff, AES Merida III, in an arbitration against the Comision Federal de Electricidad associated with various technical aspects of causes and effects of plant outages, assessment of equivalent hours and equivalent starts, fuel quality issues and declarations of force majeure at the Merida III 484MW combined cycle power plant in Merida, Mexico.
- 2/7/2011 as witness for the plaintiff in Los Angeles County Sanitation District #2 vs. Siemens Power Generation Inc.; Case No. 30-2009-00330264 in Superior Court of State of California, County of Orange. Case involves mechanical over speed and destruction of a 5.5MW electrical generator. Focus on duty of care in original and remedial design.
- 10/5/10 as witness for defendant Carter Burgess/Jacobs Engineering in Carter Burgess Inc. vs. City of Victorville, CA and DOES 1 thru 100, Superior Court of California County of Riverside Case ID RIC503565. Case involves various design, duty of care, reliability and economic issues for a 17.5 MW gas turbine-steam turbine combined cycle power plant in islanded municipal utility district in Victorville, CA.
- 9/3/10 as witness for the plaintiff in asbestos litigation George Schab vs. AC and S Incorporated et al, Superior Court of California, County of San Francisco, Case ID CGC-10-275530. Deposition testimony defended by law firm of Harowitz & Tigerman for questioning by counsel for York International and A.W. Chesterton in asbestos litigation involving alleged exposures from commercial boilers, air compressors and related campus machinery at the University of Washington.
- 5/13/10 as witness for the plaintiffs providing generic technical report and related opinions for use of asbestos in insulation of industrial boilers, turbines and related equipment at power plants, refineries and similar facilities for the law firm of Cohen, Placitella & Roth in Red Bank, NJ. Deposition covering three New Jersey cases; Mary O. Barile et al vs. 3M Company et al (Docket L-7862-07AS), William Grau et al vs. Alfa Laval (Docket L-7959-07-AS) and Savarese vs. ABB Lummus Crest Inc. et al (Docket L-4527-09 AS).
- 3/30/10 as witness for the plaintiff in Hall vs. Arizona Public Service Company et al; Superior Court of Arizona County of Maricopa Case No. CV2008-021259; Testimony by written expert report and at deposition on date cited in case involving lockout-tagout safety issues at a large coal fueled power plant.

- 2/26/10 & 3/9/10 as witness for the plaintiff in asbestos litigation Fontes et al vs. Aetna Metals et al Superior Court of California, County of Los Angeles, Case BC418084. Testimony by formal declaration and deposition. Case involving claims of asbestos exposure from pump, valve and other gaskets and seals at a metal plating facility.
- 9/3/09 as witness for the defendant in Avista Turbine Power, Inc. vs. Rathdrum Power, LLC. Arbitration Case No. 75-198-Y-00042-JMLE. (Deposition, followed by direct written testimony and appearance for cross examination). Case involved power plant performance, fuel metering, inlet air cooling control strategy and overall economic proforma related issues for a 275MW combined cycle power plant in Idaho.
- 8/27/09 as witness for the plaintiff in asbestos litigation Barbara Gaia, et al vs. Allis-Chalmers, etc. et al (deposition); Superior Court of State of California, County of Los Angeles Case BC373142. Case involving asbestos use in power plants and refineries.
- 8/6/09 as witness for the plaintiff in asbestos litigation Richard Simpson vs. AWC 1997 Corp et al. Supreme Court of New York, County of Schenectady, Fourth Judicial District, Case 2008-511 (deposition). Case involving asbestos issues in ship construction.
- 7/1/09 as witness for the plaintiff in asbestos litigation Curtis vs. Chesterton et al. California Superior Court Case ID RG09429497 (Deposition). Case involving engineering aspects of thermal insulation and use of asbestos.
- 1/15/09 as witness for plaintiff in Klickitat County Public Utility v. Waukesha Engine Dresser, Inc. et al. Arbitration in Milwaukee, WI. In a case involving issues with landfill gas fueled engine generator life cycle costs, air emissions, warranties and maintenance intervals. (Hearing testimony)
- 8/1/08 as witness for plaintiff Romero in Al Romero and Advanced Service Solutions, Inc. v. L.A. Power Joint Venture, Peter Kiewit & Sons, Inc., Kiewit Industrial Co., Bibb & Associates, Inc. and Cliff Heck; Superior Court of California, County of Los Angeles Case No. BC-309731. This case involves claims of wrongful termination & discrimination for an individual working in the area of distributed controls configuration and testing for a large steam power plant in southern California. (by Deposition)
- 8/1/07 as witness for the defendant in Basin Electric Power Cooperative vs. Lacy M. Henry, Judy B. Henry, MPS Generation et al and as witness for 3rd party plaintiffs in MPS Generation, Lacy B. Henry and Judy B. Henry vs. Ormat, Inc. and Clifford Waddell in United States Bankruptcy Court, Eastern District of North Carolina, Wilson Division. Adversary Proceeding No.L-05-00262-8-AP. This case involved technical and economic issues for a series of organic Rankine Cycle power generation plants in the north-central plains of the United States. (Deposition and hearing testimony).
- 8/1/05 as witness for the plaintiff in Homero Alvarado and Valania Alvarado vs. Bechtel Corporation, Bechtel Power Corporation, Alstom Energy USA, Inc., et al for the District Court of Harris County Texas, 152nd Judicial District Case Num. 2003-23229 (Deposition) 5/3/05 as witness for the defendant, the US Department of Justice, in the case of Mann vs. United States, Federal Court of Las Cruces, NM. CASE NO.: 98-312C (Fed.C1). This case involved engineering and economic issues for use of low to medium temperature geothermal fluids for greenhousing in southern New Mexico. Expert testimony in this case included extensive economic analysis and development of economic life-cycle proforma projections and a formal acceptance of Mr. Lane as a qualified expert in this area of work. (Deposition and hearing testimony)

Other Expert Witness and Consulting Experience

Expert consultant for a wide range of power plant projects and marine propulsion projects including projects of various sizes from a few megawatts to hundreds of megawatts of various types and fuel sources including

fuel oils, gaseous and liquefied natural gas, and various waste solids and gases including digester gas, landfill gas, municipal and agricultural solid waste and finally nuclear project experience and expertise (no longer active in nuclear power related activities by choice).

Expert witness for Saudi ARAMCO concerning three major natural gas processing facilities each operating three GE F7B (500 MW total at each facility) industrial gas turbines located near the Persian Gulf in eastern Saudi Arabia. International Arbitration case involving claims in excess of US\$100M. (2018-2019)

Expert witness for Defendant involving EPA Superfund site, a petroleum refinery in central Oklahoma, involving issues associated with control and disposal of friable asbestos. (2018 to present)

Expert witness for MWH Americas, Inc. in Eugene Water & Electric Board v. MWH Americas, Inc. et al, a case involving mechanical failure of Low Speed High Torque hydraulic motors at the Leaburg Dam hydro-electric plant in central Oregon. Technical issues include mechanical strength of metal castings, physical dynamics associated with hoisting 100 ton roll gates and potential for impulse loads from free-fall of same, and control system interlocks and safety features. (2017 to present)

Expert witness for Plaintiff Biola University in case involving maintenance issues and failure of a gas fueled Caterpillar 3516 reciprocating engine generator unit in a cogeneration application. (2018 to present) Expert witness for Defendant HR Green California in arbitration with Bowerman Power involving alleged construction and performance defects at a 20MW landfill gas fueled power generation project near Irvine, CA. (2017 to 2018)

Principal Investigator for insurance claims associated with accidental damage and business interruption at a 350MW independent peaking power plant equipped with LM6000 gas turbines on East Coast of the United States. (2015 to present on two related claims)

Expert witness for the City of Lamar, Colorado for a dispute involving alleged default by the local regional municipal utility to successfully convert a previously City owned natural gas fueled cogeneration power plant to coal fired. Work involves both technical and economic factors, rate analysis and application of best practices in design, permitting and construction. (2015 to 2017)

Expert witness for Batzer Construction, Inc. in a matter involving the refurbishment of a 7MW wood waste power plant in Anderson, CA. (2015 to 2018)

Extensive hands-on experience in diesel engine based marine propulsion system design, construction and commissioning, particularly for projects using Electro-Motive brand diesel engines. (ongoing since 2004)

Expert for engineering and economic factors for a pair of large landfill gas fueled cogeneration facilities (25Mw & 30MW), one in Southern California and the other in Rhode Island. Issued included fitness for purpose, best practices in design and operations, and financial performance of the project. (2014-2015)

Expert for defendant Woodward Governor Company in WESCO Distribution, Inc. v. On-Power, Inc., et al concerning propulsion control issues and test cell damages to a Pratt & Whitney ST18 turbine package in a marine propulsion system involving ST18 and ST40 gas turbines for the Royal Norwegian Navy. (2013 – 2017)

Expert for Defendant in DCO Energy, LLC and DCO California, Inc. v. Rhode Island LFG GENCO, LLC and Brea Power II, LLC; United States District Court District of New Jersey; Case No. 1:14-cv-05568-RBK-KMW in case involving warranties and construction defect issues for large 50MW landfill gas fueled projects. (2014 – 2015)

Expert for plaintiff in Sea Planes Inc. vs. Caterpillar, Inc., et al; Central Court of California Case Number: 2:2012cv07039. Case involves failures of marine diesel engines in a fast ferry application. (2013 - 2015)

Expert for the defendant in Mineral Park & Bluefish Energy v. Saulsbury, Inc. in Superior Court of Arizona, Mohave County CV2013-07111 concerning damages to a GE LM6000 onsite power plant at a major mining site in northern Arizona. (2013 – 2017)

Expert to the plaintiff in PPL SavageALERT v. ASML US, Inc. concerning performance and failure issues for a 1900 kW onsite cogeneration plant in Connecticut. (2103 – 2015)

Expert for the Plaintiff in asbestos litigation Henry Collins et al v. AC and S et al, Superior Court of California, Alameda County Case No. RG11599656 involving alleged asbestos exposure to a plant engineer at the Nine Mile Island Nuclear Power Station in upstate New York working with the firm of Harowitz & Tigerman of San Francisco.

Expert for the defense for case involving a fire at the El Dorado Energy (now Desert Star) 500 MW combined cycle power plant in Boulder City, NV. Issues involving the assessment and quantification of property damage and business interruption claims associated with a major fire and plant outage (2013)

Expert consultant and expert witness for the Trustee, in Angelina County et al v. Aspen Power et al, 217th Judicial District of Angelina County, TX; Cause No. TX-0186 involving a \$120M, 50MW municipal biomass waste to energy power plant in Lufkin, TX working with the firm of Faegre Baker Daniels of Indianapolis. (2012 to 2017)

Investigating engineer for the insurance carrier for a \$3 million boiler and machinery claim associated with multiple failure of one of the world's largest thrust bearings at a major hydro power unit in central Washington. (2011 initial investigation; November 2012 follow-up; 2014 consult)

Expert witness for the Plaintiff, AES Merida III, in an international arbitration against the Comision Federal de Electricidad (CFE) associated with various technical aspects of causes and effects of plant outages, assessment of equivalent hours and equivalent starts, fuel quality issues and declarations of force majeure at the Merida III 484MW combined cycle power plant in Merida, Yucatan, Mexico. (2011 to 2013 and pending appeal)

Expert witness services to InterGen associated with a arbitrated dispute with the Comision Federal de Electricidad (CFE) involving technical and economic issues at the 600MW El Bajio Combined Cycle Power Plant in Queretaro/San Luis de la Paz, Mexico. (2016 to 2017)

Engineering expert for the defendant in a \$2.2 million subrogation case involving damage to a GE LM2500 gas turbine caused by contamination of injection water for a project in the Bakersfield, California oil fields. (2012-2013 settled without trial)

Expert for defendant Gas Transmission Northwest, affiliate of Trans-Canada Gas, involving fuel quality issues and effects alleged to have resulted in premature failures of GE Frame 7 gas turbines operating in a combined cycle power plant in Hermiston, OR. (2011 to 2013 settled without trial)

Expert for plaintiff Lake Cogeneration vs. Florida Power Company dba Progress Energy in a case involving operations and maintenance issues and operating economics for a LM-6000 based combined cycle power plant in central Florida. (2011 to 2012 Settled without trial)

Expert witness for defendant INMAR and their insurance carrier, Lloyd's of London, in a case involving the catastrophic failure of a 12-645 EMD engine on an ocean-going tug boat that was operating in the Gulf of Mexico. (6/11 to 3/12)

Expert witness for defendant Power Management Engineering vs. Energy and Power Solutions et al, Superior Court of California, San Bernardino, Rancho Cucamonga District, Case ID CRVIS 808649 involving a small 290 kW packaged cogeneration plant working through the Law firm of Gordon & Rees, Los Angeles. (2009 to 2012)

Expert consultant for FM Global Insurance, affiliate of Factory Mutual Insurance, for a boiler and machinery claim associated with the explosion of a large natural gas/digester gas fueled reciprocating engine operating in a cogeneration configuration at a large municipal waste water treatment plant in Albuquerque, MN. (10/10 to 1/11) and forensic assessment of a boiler explosion in Los Angeles area (5/11 to 8/11)

Troubleshooting of vibration problems and redesign of special vibration mounts for a 16-cylinder 710 EMD generator set at the Copper Valley Power Plant in Alaska (2011); similar work on the Factory Ship Northern Victor 645 EMD generator sets, as well as similar work on the M/V Tustumena and M/V Aurora, long range ferries operating in southern Alaska.

Expert for plaintiff in a personal injury case involving a small explosion at a high-pressure natural gas compressor station for fueling of municipal transit vehicles in Simi Valley, CA. Issues involve duty of care for design, maintenance and operation and conformance to applicable codes and standards. (2010-2013 Settled)

Expert for the defendant, the State of Connecticut, in the case Resource Technology Corporation vs. Connecticut Resources Recovery Authority (Case 99-35434) United States District Court Northern District of Illinois – Eastern Division. This case involved issues concerning operation, maintenance and economic damages at a landfill gas powered reciprocating engine generation plant in Connecticut. (2002)

Expert for the defendant in a criminal case involving death of a plant worker at a gravel plant in San Francisco area. Expert analysis of Lockout-Tagout (LOTO) procedures and related training and practices. (2010 to 2011)

Expert for plaintiff in case involving claims of fraud, misrepresentation and faulty workmanship and materials associated with the repeated failure of a remanufactured Detroit Diesel Corporation Series 60 diesel engine in a long-haul truck. Testimony in form of affidavit prepared August 2010 and October 2012. (5/10 to 12/10; reactivated 6/12 and pending trial as of 1/13) Case being handled Pro-bono except for reimbursement for incidental expenses.

Expert for the plaintiff in Robert Walker and Alberta Walker vs. Burnham Company et al, an asbestos related litigation in Superior Court of New Jersey, Middlesex County, Docket No. L-9945-09. (5/10 to 7/10)

Expert consultant to law firm of Fisher, Kanaris (Chicago) for group of insurance companies for assessment of manufacturer's claims of increased warranty exposure associated with new heavy-duty diesel engines designed to latest EPA-10 emissions regulations for on-highway applications. (3/10-6/11)

Expert consultant to major international pharmaceutical company for investigation of a major incident involving large natural gas fueled reciprocating engines operating at a cogeneration plant in San Diego, CA. Failure involves extensive engine damage caused by water intrusion from a failed Heat Recovery Stream Generator. (2/10 to 6/10)

Consultant to a private development company for design and equipment selection for small, grid-connected cogeneration systems to be fueled by gasified wood waste. (10/09 to 1/12)

Consulting expert for technical and safety issues including requirements and adequacy of warning labels for two cases involving multiple deaths due to carbon monoxide poisoning from operation of a small 3500 to 5500 Watt portable engine driven generators in the eastern United States. (2008)

Expert for law firm of Dow, Golub, Berg & Beverly, LLP and their client, Shaw Group, Inc. in Occidental Petroleum Corporation vs. Shaw Global Energy Services, Inc. for a case involving an explosion and fire at a cogeneration power plant in Texas. (Cause No. 2007-01482, 215th Judicial District Court of Harris County, Texas). Work involved failure analysis, cost of repairs, and duty of care issues for plant operator and maintenance subcontractors for a large industrial power plant. (2008 to 2010)

Completed a major case assignment and remain under retainer to provide expert witness services for major international engineering, design & construction firm for litigation and risk assessments related to plant operations and asbestos exposure issues at land-based power generation stations, refineries and similar heavy industrial projects. This client has requested general anonymity though I am able to disclose their identity to any party with a legitimate need for that information. (2007 to 2008)

Provided technical and engineering economic analysis in support of an \$80 million municipal bond default resulting from the failure of a large municipal waste-to-energy, municipal solid waste incineration and energy recovery project. Services provided to one of the world's largest investment banking and bond underwriting firms. Services included analysis of project technical and economic performance relative to original investor prospectus, determination of the causes of the shortfalls in performance and offering of opinions regarding organizations responsible for those errors. (2008)

Provided expert witness services on various personal injury/illness cases involving individuals suffering from mesothelioma and other asbestos related illnesses from exposure associated with work in, on or around US Navy and/or US Coast Guard vessels and/or in shipyards. This work included determination of probable exposure scenarios on submarines and other vessels both underway and in new construction, repair or overhaul. This work was performed for the Law Firm of Early, Ludwick, Sweeney & Strauss (New Haven, CT.) Named cases by plaintiff surname to date include Drucker, Paolino, Hanlon, DesPres, Kotecki and Smart. (2006) Additional cases for law firm of Levy, Phillips & Konigsberg (New York, NY) for cases with plaintiff surnames of Simpson and Smith (2008 to 2014). Consulted to a major international engineering contracting firm on a mesothelioma case involving both power plant and shipyard exposures to asbestos (2008). Stevens vs. CBS et al for Bergman Draper Ladenburg (Seattle) (2012)

Expert for Plaintiff in Al Romero and Advanced Service Solutions, Inc. v. L.A. Power Joint Venture, Peter Kiewit & Sons, Inc., Kiewit Industrial Co., Bibb & Associates, Inc. and Cliff Heck; Superior Court of California, County of Los Angeles Case No. BC-309731. Case involves technical issues associated with plant controls automation and boiler, burner and turbine generator safety, NFPA code compliance and other related issues for a large utility combined cycle power plant. (2004-2005 and 2008 to 2010; settled)

Expert to Klickitat Public Utility District (KPUD) against Dresser Industries, Waukesha Engine Division for landfill gas fueled power generation project in south, central Washington. Case involves range of technical and contractual issues for warranties, useful life, emissions conformance, maintenance life cycle, equipment availability & reliability for a 10.5MW landfill generation project. Case settled through arbitration. (2008 to 2009)

Completed case, Basin Electric Power Cooperative vs. Lacy M. Henry et al vs. Ormat, Inc. and Clifford Waddell; United States Bankruptcy Court, Eastern District of North Carolina, Adversary Proceeding No. L-05-00262-8-AP as expert for Lacy M. Henry et al. Expert witness for the Plaintiff providing primary and

supplemental reports and with deposition taken on 8/1/07. Case noticed as settled on 9/25/07 soon after submittal of supplemental report confirming underlying basis for economic analysis and opinions on valuations for the Plaintiff.

Expert witness to Watson Law Group and the Los Angeles Department of Water & Power as potential Plaintiff associated with anticipated litigation associated with the catastrophic failure of a utility-sized steam turbine due to introduction of debris into the rotating machinery. Based on expert recommendations this case was dropped in November 2005.

Expert witness for the Plaintiff in *Alvarado v. Becon Construction Company, Inc., Bechtel Corporation and Alstom Energy USA, Inc.* in 152nd District Court of Harris County, TX in matter involving personal injuries in an industrial accident at a large power plant. Work involved forensic analysis of engineering and operational matters including OSHA Lockout/Tagout requirements. Deposition taken; case settled prior to trial.

Expert witness for defendant working through attorney Carrington, Coleman, Sloman & Blumenthal, LLP in *Houston Casualty Company, Comision Federal de Electricidad and Seguros Comercial America, S.A. de C.V (plaintiff) vs. Siemens Power Corporation et al.* in the District Court of Dallas County, Texas in matter involving turbine blade failures and other damage at a utility power plant in Mexico. Work to date has included preparation of an expert report and formulation of opinions on matters related to proper operation of a large combined cycle power plant. Depositions are understood to be set for November-December 2005 timeframe though notice has just been provided indicating preliminary settlement agreements have been reached as of 15 October 2005.

Expert witness for defendant Davis Electric in *Florida Power & Light vs. Black & Veatch Corporation*, a case involving damage to a large gas turbine due to uncontrolled spray of water into the intake of that engine. Prepared expert report and physical demonstration of water injection tubing assembly. Case settled before deposition or trial. 2005.

Expert witness for defendant, the U.S. Department of Justice, in *Stanley K. Mann vs. United States of America* in U.S. Court of Federal Claims No. 98-312C involving assessment of the economic potential of the direct use of geothermal energy for heating a proposed commercial greenhouse project in New Mexico. Work involves technical and economic feasibility analysis for a conceptual project. Report filed April 2005, deposed 4 May 2005; trial completed in November 2005.

Expert witness for defendant in *Desert Power LP vs. Sermatech et al* for various technical & engineering economics focused on the methods of calculation and meaning of Equivalent hours and Equivalent Starts associated with a gas turbine based peaking power plant project in Utah. Case settled on eve of date for submittal of expert report and planned depositions. (Settled January 2005)

Expert witness for engineering and project economics for Plaintiff's attorney Gauthier, Downing, LaBarre, Dean & Sulzer (later Stephen M. Huber, Gauthier, Houghtaling & Williams) (Metairie/New Orleans, LA) for *ESI, Inc. (DELASA) v. Coastal Power Company, Tenneco, et. al.* (CDC Docket No. 95-13172 "F") and related case *Walk Haydel & Assoc. v. Coastal Power Production Company et. al.* (Delassa) etc. (U.S. Court of Appeals, Fifth Circuit Docket 06-30886) involving an Independent Power Producer project in El Salvador. Merchant Power Plant economics, plant life-expectancy, rate analysis and other issues associated with large 2-cycle diesel engines fueled by Bunker-C (Heavy Oil). (2004-2005, settled before depositions or trial)

Expert witness for Defendant in *Sithe Daesan Cogeneration Company v. Hyundai Petrochemical; International Chamber of Commerce (ICC-Singapore) Arbitration Case No. 12672/TE/MW*; party appointed testifying expert by Hyundai Petrochemical and counsel Allen & Overy (London/Hong Kong) and Shin & Kim (Seoul) for technical construction & performance, engineering economics and energy sales agreement issues with "Third Party" owned and operated multi-unit combined cycle power plant at the largest

petrochemical refinery complex in South Korea. Work included detailed quantum analysis of claims and rate structure in case involving over \$100 Million in claims. (2003-2004 Settled before depositions or trial)

Forensic investigation of technical design and operations issues associated with a major power outage at the Bellagio Resort in Las Vegas that experienced a major electrical distribution system failure caused by a cable fault in an underground vault. Work performed for a major international insurance carrier and other parties whose identity is yet to be made public. (July 2004 – Noticed as settled November 2007)

Expert witness for the defendant for The Estate of Vernon Cornelius Dunaway et al vs. Channel Terminal Corporation d/b/a International Terminals Company, Mitsui & Co. (USA) et al In Probate Court No. One, Harris County, Texas in case involving major steam accident and alleged violations of OSHA rules including 29CFR1910 regulations for control of hazardous energy (lockout/tagout). Expert Witness services for the Defendant Counsel Hilburn, Shores & Sherer, Houston, TX (Case “suspended” March 2005 then announced as “settled” in July 2005).

Expert consultant to Defendant in Montenay International et al v. Asplundh Construction et al for a commercial litigation in Nassau County, New York. Consultant and expert for defendant in case involving major damage to electrical and mechanical power generation equipment at a 12 MW independent power producer municipal solid waste to energy facility. Issues include application of NFPA/NEC and utility interconnection codes and standards as well as other power plant design, operations and maintenance issues. Contracted by defendant law firm Chesney & Murphy, LLP, Baldwin, NY. (2003 – 2004 case suspended, reactivation noticed 3/05; case understood to have been abandoned by plaintiff or to have settled)

Forensic investigations and case review work for subrogation screening for a major insurance carrier for cases involving 4MW reciprocating engine driven cogeneration project and a 6MW lumber mill waste fueled steam turbine generation project, both located in Northern California. (2004)

San Francisco State University, consultant for preliminary proceedings and OSHA citation appeal associated with a personal injury from high temperature steam and/or condensate at an on-campus energy plant. (2003-2004)

Claude Brown European Patent Application No. 98903513.4; technical opinions working for Claimant leading to formal affidavit regarding merits of claims for inventive features involving steam separation for mobile agricultural superheated steam generation units. Work for law firm Sheppard, Mullin, Richter & Hampton LLP of San Francisco, CA. (June/July 2003)

Noseff vs. Peter Paul Electronics et al; Bernalillo County (New Mexico) No: CV-2001-01278; Expert review and forensic investigation of a natural gas fire/explosion causing the death of a maintenance technician at a gas interconnection station in Hobbs, New Mexico. Work included various duty of care issues and conformance to applicable OSHA Regulations and NFPA Code requirements. September 2002 to September 2003 for Defendant’s attorney Hatch, Allen & Shepherd, P.A. Issues addressed include release of hazardous energy, OSHA lockout/tagout requirements, NFPA/NEC hazardous area classification & required equipment, safety procedures, and related matters.

Varnsdorf Pty. Ltd. versus Fletcher Construction Australia Ltd. Commercial arbitration involving \$120 million in claims with key issues of duty of care of designer, manufacturer and operator, fitness for purpose, expressed and implied warranties, operations and maintenance methods, root cause analysis and assessment of technical and economic effects of elevated firing temperatures and abnormally high number of shutdowns-restarts for a major project involving six power combined cycle power plants referred to as the Victorian Hospital Cogeneration Project in and around Melbourne, Australia. Worked for owner, AXA/National Mutual of Australasia and attorney Freehills. Assignment involved 18 months temporary residency in

Melbourne Australia at Client request. This was an extremely extensive engagement involving over 6,000 man-hours of professional services work as a consultant and expert. (1996-2001)

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, 2001 to 2002 for Defendant’s attorney Ross & Hardies. Final testimony completed November 2002. I provided sworn testimony in court for this case.

Strategic Resource Solutions, Inc. vs. San Francisco Unified School District, et al; Investigation and analysis of boiler failures and furnace explosion, including duty of care issues and NFPA Code compliance review of the boiler/burner systems. Work for San Francisco Unified School District via City Attorney’s office, June 2002 to 2004.

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. Expert report contributed to early settlement of case without formal expert reports, depositions or trial.

Flagg Energy Development Corp. et. al. (Kenetech) versus General Motors Corporation (dba Allison Gas Turbine) Re: Hartford Hospital Cogeneration Project, Hartford, Connecticut; Superior Court for the Judicial District of New Haven at Meriden, CN (CV 92-0242198-S). Work for Plaintiff attorney Smith & Fleming, Atlanta, GA. 1996-1997. Provided sworn testimony in depositions for this case in 1996.

Publications & Presentations:

“Measure by Measure”; Parametric Fuel Metering for Liquid Fueled Combustion Turbines and Diesel Engines article; “On-Peak Performance”, a supplement to Consulting-Specifying Engineer Magazine, publisher Reed Business Information, November 2002 special issue for Electrical Generating Systems Association Annual Meeting.

Parametric Fuel Metering for Industrial Gas Turbines; presentation to general session at 2003 Rolls-Royce Turbine Users Group Conference, Houston, TX.

“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.

“Engine Firing Temperature Optimization for LM-500 Industrial Gas Turbines”; private research study report for Roche Pharmaceutical Company (New Jersey & Switzerland); October 1999.

“New EMD Power for Catalina Island” published as an “Application Report” by Diesel Gas Turbine Worldwide Journal, April 1996

USS Thomas A. Edison SSBN-610 Ship’s Information Book (SIB) and Training Aid Booklet (TAB) set, Rev. 2, 1974; Comprehensive revision of 14 volume set of information and training manuals covering all ship’s systems with focus on new upgrades including new reactor plant, new sonar/radar/visual sensor systems, new torpedo and missile launch and fire control systems, SubSafe flooding prevention & recovery upgrades, and other navigation, communications, engineering and ship’s control changes performed during major overhaul. These were classified documents for restricted use onboard Navy warships.

Speaker for College Bound High School student on Career Development in Engineering with emphasis on underprivileged students use of U.S. Military and other sources of grants and scholarships as representative of the Washington Society of Professional Engineers (2020 ongoing)

Patents, Inventions & Other Interests:

“High performance coolant system with manifold for large diesel engines”, U.S. Patent # 5,337,705 (August 16, 1994). Patented device used on large marine and stationary ElectroMotive Diesel (EMD) engines in United States and Australia. Patent was allowed to expire after sale of products to all known potential users.

“Keyed Split Ring Gear” for large diesel engines, patent disclosure filing submitted but no patent processed due to lack of commercial interest. Numerous units sold using company “secret” methodology.

“Parametric Fuel Metering for Liquid Fueled Industrial Gas Turbines and Diesel Engines”; patent disclosure filed 2002, formal patent application dropped due to lack of economic incentive, but several systems sold unprotected by patent rights.

Inventor for unique application using waste heat from combustion turbine effluent oil for heating influent raw field gas (methane) to add superheat to water and liquid hydrocarbon saturated gas supply. (Sold to customer in Peru; no patent application filed)

Designer/Inventor of a custom, portable, semi-robotic computer room environmental data collection unit for 3-D data collection of ambient temperatures, humidity and under-floor forced air pressures for major data center computer rooms. Systems designed and build for Johnson Controls who applied them to major data centers for precision balancing of computer room environmental conditioning systems.

Personal hobbies include travel, tennis, gourmet cooking and classic car restoration that has included a 1957 Austin Healey 100-6, 1968 VW “kit car” conversion to “bath tub” Porsche, successful recovery of an electrically distressed 2004 BMW 530i and the total restoration of a severely distressed 1959 Morris Minor 1000 Traveler Coupe (now running beautifully!).



Figure 3 - 1959 Morris Minor 1000 Traveler Coupe at British Car Show in Seattle 2018. This car is used regularly for local transportation in the Seattle area.