STEVEN A. LEFTON
Chemical Engineer

SPECIALIZED PROFESSIONAL COMPETENCE

Management and operational expertise in fossil and nuclear utility power plants, including the construction, start-up, maintenance, and on-line operational procedure writing, check-out, and start- up of power plant equipment. Experienced in the operation of fuel handling and fuel burning equipment, including pulverizers, fans, sulfur dioxide/particulate control scrubbers, precipitators, water treatment, gas/steam turbines, and ash handling systems. Experienced in the calibration and design of utility boiler-turbine control systems. Expertise in water treatment, feedwater treatment, and boiler water control measures used to prevent deposition and corrosion damage to power plant equipment.

Work experience includes design and implementation of heat rate and efficiency monitoring programs for oil and gas fired boilers; thermodynamic analysis and efficiency calculations of power plant components, such as boilers, turbines, gas turbines, air heaters, pulverizers, and feedwater heaters; analysis of coal slagging and fouling in utility boilers; and oil, gas, and coal burner design and optimization.

Management of a major utility nuclear power plant turbine generator failure investigation with specific emphasis on water chemistry contaminants of the condensate system, steam generator, water, steam purity, turbine blade/disk failures, and electrical generator failure analysis.

Past utility fossil power plant related work includes the project management of investigations into the performance of fossil power plant boilers, heat recovery steam generators, turbines, gas turbines, electrical generators, and pulverizers; failure analysis of boiler tubes; analysis to predict the remaining useful service life of boilers, superheaters, reheaters, headers, turbine blading, and tubing; and design and modification of utility power boilers to eliminate tube failures.

Recent work includes project management and expert testimony/litigation support in large utility power plant legal cases. These cases involved boilers, heat recovery steam generators, gas turbines, pulverizers, plant auxiliaries, fires, explosions, availability/reliability modeling, plant life assessment, plant life extension, and the analysis of plant logs to calculate power production costs for revenue requirements based on calculations of damages and production costs. Currently involved in cost analysis associated with cycling large and small fossil power plants.

LEGAL, INSURANCE, PUBLIC UTILITIES COMMISSION, AND LITIGATION RELATED WORK

Puerto Rico Electric Power Authority — Analysis of eight GE Stag units, Frame 7000 gas turbines, including the following: blade failures; blade coatings; fuel oil trace elements; pumps; combustion cans; combustion controls; and heat recovery steam generator (HRSG) tube/design defects. This included an industry-wide survey of blade defects, blade coatings, HRSG defects, and corrective measures. Provided testimony and litigation support to in-house and outside counsel.

Landfill Gas Company — Analysis of failures of selected gas turbine components in Mitsui gas turbines. This included an analysis of cost impacts on the plant.

Hawaii Electric Light Company — Analysis of blades, blade coatings, combustion liners, transition pieces, combustion systems, design defects on a Solar gas turbine manufactured by ABB. This included a review of all industry available blade coatings and fuel oil treatment options available to increase blade life.

Illinois Power Company — Analysis and testimony of Illinois Power Company fossil-fired power plants and gas turbine engines to determine their maximum rated capacity and future plant reliability. This resulted in testimony to the Illinois Commerce Commission on the megawatt rating of the 18 coal-fired power plants and 10 gas turbines.

Cajun Electric Power Cooperative, Inc. — Analysis and testimony relating to two 550 MW coal-fired boilers, turbines, and ball tube pulverizers. This includes the impact of the failures on the plant's reliability, damages incurred, and plant production costs.

Florida Power Corporation — Testimony to the Florida Public Utilities Commission on utility power plant cycling costs and curtailment of cogeneration plant output.

Insurance Firm — Investigation of steam turbine failure at Lawrence Station of Kansas Power & Light Company.

Kansas Gas & Electric Company — Investigation and analysis of a boiler explosion at KCP&L's LaCygne Power Plant.

Insurance Firm — Investigation of boiler chemical-cleaning-related condenser tube failures at San Diego Gas & Electric Company's South Bay Power Plant.

Pacific Gas & Electric Company — Testimony in Federal court on a steam attemperator failure, resulting pipe rupture and asbestos release. This included an industry-wide survey of utility power plant valve, attemperator, and piping failures.

Pacific Gas & Electric Company — Investigation and review of testimony regarding the failure of the Rancho Seco Nuclear Power Plant turbines, generator, water treatment/analysis system, and condensate polisher systems.

Insurance Firm — Investigation of turbine failure at a manufacturing plant involving loss of lubrication.

Nevada Power Company — Analysis of the cost of cycling of coal-fired and gas turbine/combined cycle power plants. Testimony in three arbitration hearings involving cycling, negative avoided costs, and impacts resulting from qualified generating facilities.

EDUCATION AND PROFESSIONAL BACKGROUND

- B.S. (Chemical Engineering), Kansas University (1969)
- Pre-Engineering (Kansas State College of Pittsburgh)
- Bailey Meter School for Instrument Engineers (1972)
- Past Chairman, Vice Chairman, Treasurer, Secretary, Finance Chairman, and Public Information Chairman for American Nuclear Society, Northern California Section (1978-1988)
- Analysis of German Utility Power Plants to Explore European Methods of Coal Combustion and Power Plant Auxiliaries, such as Pulverizers, Fans, Ash Systems, etc.
- Startup Engineer for a Brazilian Boiler Turbine Cogeneration Plant
- Startup Engineer on Approximately 20 Boilers and Boiler Control Systems, as well as Procedures Preparation, Operator Training, Water Treatment Requirements, and Chemical Cleaning of These Units
- Pulp and Paper Experience
  - — Construction, Startup, and Performance Testing of a 1100 Ton and a 1000 Ton Per Day Black Liquor Recovery Boiler
  - — Service Engineer and Trouble Analysis of More Than 20 U.S. and Canadian Pulp and Paper Mills
  - — Startup of Low Odor Black Liquor Boiler and Bark Fired Boilers
  - — Testing of Emergency Boiler Blowdown Systems
  - — Analysis of Power Boilers Burning Bark and Waste wood
  - — Investigations of Smelt Water Explosions

SELECTED REPORTS, PUBLICATIONS, AND INVITED LECTURES

The Real Cost of Cycling Powerplants: What You Don't Know Will Hurt You, article Electric Light & Power Magazine (with P.M. Besuner and G.P. Grimsrud) (November/December 2002)

Cost of Cycling Analysis for South Bay Power Plant Units 1 – 4 (with P.M. Besuner, G.P. Grimsrud, and T.A. Kuntz) (October 2002)

Duke Energy North America Moss Landing Power Plant Units 6 & 7 Reliability Upgrades and Unit Cycling Analysis, (with K.D. Speer of Duke Power California) (August 2002)

Experience in Cycling Cost Analysis of Power Plants in North America and Europe, (with P.M. Besuner, G.P. Grimsrud, and T.A. Kuntz) (March 2002)

Power Plant Operations and Cost Optimization Using Real Time Cost Analysis Tools, Presented at the International Conference on Advances in Life Assessment and Optimization Of Fossil Power Plants (with P.M. Besuner, T.A. Kuntz) (January 2002)

Cost of Cycling Analysis at Union Fenosa's Meirama Unit 1 (with P.M. Besuner, T.A. Kuntz, and G.P. Grimsrud) (February 2001)

Cost of Cycling for IIlinova Corporation Power Plants (with P.M. Besuner, G.P. Grimsrud, and T.A. Kuntz) (March 2000)

Failure to Achieve Hot Selection Component Service Intervals Why and What to do About It (with T.A. Kuntz) (January 1998)

Cost of Cycling Estimates for Coronado Generating Station (with P.M. Besuner, G.P. Grimsrud, T.A. Kuntz, and Joe Lesiuk) (January 1998)

Cost of Cycling Study for Clover Bar Units 1 and 3 (with G.P. Grimsrud, P.M. Besuner, and T.A. Kuntz) (January 1998)

Cycling Fossil-fired Units Proves Costly Business, article Electric Light & Power Magazine (with P.M. Besuner and G.P. Grimsrud) (July 1997)

*Cost of Cycling Estimates for Electricity Supply Board Unit Types: Poolbeg Units 1, 2, and 3 Tarbert Units 3 and 4 (w*ith P.M. Besuner, G.P. Grimsrud, and T.A. Kuntz) (May 1997)

T*otal Cost of Cycling Fossil Power Plants* (with P.M. Besuner, G.P. Grimsrud, and T.A. Kuntz) (April 1997)

Failure to Achieve Hot Section Component Service Intervals -- Why and What to Do about it, Presented at the American Society of Mechanical Engineers Turbo Expo 97 - Land, Sea, and Air in Orlando, Florida (with T.D. Burnett, T.A. Kuntz, and S.R. Paterson)

Understand What it Really Costs to Cycle Fossil-fired Units, article Power Magazine (with P.M. Besuner and G.P. Grimsrud) (March/April 1997)

Cost of Cycling Estimates for Amos Unit 3 (with P. M. Besuner, G. P. Grimsrud, T. A. Kuntz, and J. J. Yavelak) (November 1996)

Using Fossil Power Plants in Cycling Mode: Real Costs and Management responses (with G.L Norman of Florida Power Corporation, J.A. Vaughn of Los Angeles Department of Water, Power, and A.C. Crawford of Public Service Company of Colorado) (October 1996)

Cost of Cycling Estimates for Representative Public Service Company of Colorado Fossil generation Units (with P.M. Besuner, G.P. Grimsrud, and T.A. Kuntz) (December 1996)

Estimating the Total Cost of Cycling Operations at the Los Angeles Deportment of Water and Power, Haynes Generating Station, Unit 5, Presented at the 1996 EPRI Plant Maintenance Conference Baltimore, Maryland (with P.M. Besuner and R.J. Schreiber) (August 1996)

Power Plant Cycling Operations and Unbundling Their Effect on Plant Heat Rate (with P.M. Besuner)

*Total Cost of Cycling Fossil Power Plants Florida Power Corporation (*with P.M. Besuner, G.P. Grimsrud, and J.J. Yavelak)

Review and Improvement of Tennessee Valley Authority (TVA) Estimates of Cycling Costs, APTECH Report AES 92051685-2 (with P.M. Besuner and G. Biggerstaff) (September 1992).

Water Chemistry Examination and Procedures Review at Salt River Project's Navajo Generating Station, APTECH Report AES 91021411-2-1, Revision 1 (with I.M. Abrams) (February 1992).

Review and Improvement of Florida Power and Light Company Methodology for Estimating the Cost of Cycling, APTECH Report AES 91011380-2-1 (with P.M. Besuner and G.P. Grimsrud) (February 1991).

Assessment of Heat Recovery Steam Generator Tubing Life at the Aguirre Power Plant, APTECH Report AES 90061265-2-1 (with H.D. Vaillancourt) (January 1991).

A Methodology to Measure the Impact of Cyclic Operations and Power Derations on Plant Life and Reliability, Presented at the Electric Power Research Institute Fossil Plant Cycling Conference (November 1990).

Condition Assessment and Remaining Useful Life Study of High Temperature Superheater Deaerator Storage Tank and the Waterwall Tubing at Palo Seco Steam Plant, Unit 3, Puerto Rico Electric Power Authority, APTECH Report AES 90011178-2-1 (with P. Deb, S.D. Miller, H.D. Vaillancourt) (March 1990).

A Reheat Outlet Header Inspection Methodology, Proceedings, Fossil Plant Inspections Conference, Electric Power Research Institute (with S.A. Bush and S.H. Nelson) (August 1987).

Methodology for Assessing the Remaining Useful Life of Critical Power Plant Components, Electric Power Research Institute Conference, Life Extension of Fossil Power Plants (1987).

Guard Against High-Temperature Steam-Piping Failures, Power Magazine (with M.T. Cronin) (June 1986).

Investigation and Analysis of Tube-to-Header and Header-to-Header Cracking at Salt River Project's Coronado Generating Station, Unit No. 1, Boiler, APTECH Report AES 8204320-2 (with J.D. Byron) (March 1985).

Evaluation Study of Heat Recovery Steam Generator at Aguirre Combined Cycle Plant, Puerto Rico Electric Power Authority, APTECH Report AES 8311418-1 (with T.W. Rettig and R.C. Cipolla) (February 1984).

Assessment of Primary and Secondary Superheater Tubes From Louisiana Station Unit 3A to Determine Creep Damage and Remaining Useful Life, Gulf States Utilities Company, APTECH Report AES 8309409-1 (with T.W. Rettig) (December 1983).

Investigation of Tire Cracks on Mill 2-2 and Tire Flaking on Mills 2-2 and 2-3 at Big Cajun II, Unit 2, Cajun Electric Power Cooperative, APTECH Report AES 8307397 (with L. McIntosh) (October 1983).

ADDITIONAL INFORMATION

For more information regarding APTECH's personnel and services, please contact our Corporate Headquarters in Sunnyvale, California (USA) at (408) 745-7000 or visit our website (http://www.aptecheng.com).