

T. STEVEN I. TORBOV
Mechanical Engineer

SPECIALIZED PROFESSIONAL COMPETENCE

Experience and expertise ranges from the research and development of new technologies and/or system modifications to the implementation of this research and development in the design, installation, and start-up and tune-up phases in utility power plant and industrial boilers and furnaces, heat recovery boilers, and combustion equipment, rotary kilns, large diesel internal combustion engines, heat transfer, fluid mechanics. Special skills in steam boiler and industrial furnace design related to combustion, corrosion, circulation, and boiler component failure analysis. Experienced in fuel data interpretation, fuel properties, equipment impacts, and fuel switching projects for utilities and industrial power plants. Experienced in developing engineering calculation procedures for combustion and heat transfer analysis, natural or forced internal circulation thermal hydraulics, combustion gas aerodynamics, unit performance and efficiency, and component stress analysis. These procedures have been applied to utility and industrial boilers and furnaces, valves, heat exchangers, and steam and gas turbines.

Previous experience includes conducting research and development programs in the areas of combustion of solid, liquid, and gaseous fuels; steam boilers and industrial furnace design; and unique test hardware design. Experience also includes industrial marketing of new processes. Major achievements involve the development of numerous combustion-related processes, including a method for cofiring natural gas in a utility coal boiler; a new, highly-effective process for flue gas SO_x removal through sorbent injection; a new low NO_x gas burner for gas turbine exhaust supplemental firing; a low NO_x combustor design for heavy fuel oil; a new oil atomizer with constant atomization characteristics for a wide range of oil flow rates; a utility boiler burner for bituminous coals; and several steam boiler process analysis calculation codes.

EDUCATION AND PROFESSIONAL BACKGROUND

- B.S. (Mechanical Engineering), Technical University of Bulgaria (1958)
- M.S. (Mechanical Engineering), Technical University of Bulgaria (1960)
- Post Graduate Study in USSR (1963)
- Post Graduate Study in Hungary (1965)
- Nine Patents Granted in the Areas of Combustion and Pollution Control (six European and three United States patents)

SELECTED REPORTS, PUBLICATIONS, AND INVITED LECTURES

Summary of Opinions in the Matter of Richard Baumer et al. v. Mendoza, Ribas, Farinas & Associates, et al., with K. Clark, APTECH Report AES 05045762-4-1 (September 2005).

Assessment of Metallurgical Damage to Flue Gas Coolers E-323A and E 324A During Normal Operation and Loss of Feedwater Flow, with T. Rettig, APTECH Report AES 05065845-2-1 (July 2005).

Heat Recovery Steam Generator Repair Procedure at the Panuco Project, APTECH Report AES 05055810-2-2 (July 2005).

Examination of Heat Recovery Steam Generators in the Suez Cogeneration Plant, APTECH Report AES 05055810-2-1 (June 2005).

Burner Diffuser Cone Reinstallation for Steam Boilers 1, 2, and 3 at the Apache Plant, APTECH Report AES 05015638-3-1 (March 2005).

Inspection of Marine Diesel Engines, with E. Sullivan, APTECH Report AES 04075475-4-1 (February 2005).

Inspection of Marine Diesel Engine from Acadia Ferryboat, with E. Sullivan, APTECH Report AES 04075475-4-2 (February 2005).

Inspection of Marine Diesel Engines from the Howard Stapp Tubboat, with E. Sullivan, APTECH Report AES 04075475-4-3 (February 2005).

Investigation of Damage to Low Pressure and High Pressure Turbine Components for Ingomar Packing Company, with R. Moser, APTECH Report AES 04125625-2-1 (February 2005).

Smoke Tubes Deformation Analysis for Fire Tube Boilers Installed at TMC Healthcare, Tucson, Arizona, APTECH Report AES 04055424-2-1 (July 2004).

Investigation of Diesel Engines Exposed to Contaminated Fuel, with K. Clark and E. Sullivan, APTECH Report AES 04045401-4-1 (May 2004).

Review of Expert Reports and Opinions Concerning an Explosion and Fire Aboard the MAERSK TOKYO on February 4, 1999, with S. Kohan and K. Clark, APTECH Report AES 03075112-4-1 (July 2003).

Valero Refinery Foster Wheeler Boiler Impact Study after Combustion Low NO_x Modifications, APTECH Report AES 03014946-2-1 (March 2003).

Sheerness Generating Station Retrofit Review Project, with K. Hara and P. Wheeler, APTECH Report AES 02104895-2-2 (December 2002).

Study of Vibration Problems in Aalborg Boilers at the Dearborn Industrial Generation Plant for CMS Energy, APTECH Report AES 01104542-2-1 (January 2002).

Engineering Evaluation of Superheater and Reheater Performance at Huntington Canyon Boiler 182, APTECH Report AES 01014255-2-1 (December 2001).

An Engineering Evaluation of the effects of Operating Load on Equipment Damage, Forced Outage Rates and Costs at Jim Bridger, Unit 1, with P. Besuner, M. Cronin, T. Kuntz, and S. Lefton, APTECH Report AES 00094141-2-1 (July 2001).

Manitoba Hydro Selkirk Generating Station Units 1 and 2 Fuel Switching Study, APTECH Report AES 01014250-2-1 (June 2001).

An Engineering Evaluation of the Effects of Operating Load on Equipment Damage and Forced Outage Rates at Labadie, Unit 3, with M. Cronin, T. Kuntz, and S. Lefton, APTECH Report AES 00064047-2-1 (April 2001).

Contra Costa Unit 7 Furnace Rear Wall Tube Failure Investigation, with R. Moser, APTECH Report AES 00074081-2-1 (January 2001).

Evaluation of Todd Combustion Low NO_x Combustion System and the Boiler Impact from the Low NO_x Combustion Process for Alcon, Pinjarra Plant Boilers Type VU, APTECH Report AES 00054021-2-1 (November 2000).

Engineering Evaluation of the Effect of Operating Load on Equipment Damage and Forced Outage Rates, with M. Cronin, APTECH Report AES 98093519-2-1 (November 1998).

Engineering Evaluation of the Effect of Operating Load on Equipment Damage and Forced Outage Rates, with M. Cronin, APTECH Report AES 98083486-2-2 (October 1998).

Modification and Conceptual Design of Combustion Engineering Utility Boiler Type Vu60 for Concepcion S.A., Guatemala, APTECH Report AES 97103200-2-1 (May 1998)

Boiler Performance Investigation, Sacramento Control Plant, APTECH Report AES 97073131 2-1 (September 1997).

Investigation of Firebox Explosion in Boiler, Unit 3 at Lamb Westin, Incorporated, APTECH Report AES 97073119-4-1 (September 1997).

Fire Cause Analysis Ashland School, New Jersey, APTECH Report AES 96112913-4-1 (January 1997).

Investigation of Steam Methanol Reformer Operation Problems Sterling Chemical Company Texas City, Texas, APTECH Report AES 96102876-3-1 (November 1996).

Alcoa of Australia Pinjarra Plant Low NO_x Retrofit Burner System Specifications, APTECH Report AES 96072807-2-1 (September 1996).

Heat Transfer Calculations for Sun Company Inc. Steam Boilers, Units 38 and 40 After Low NO_x Burners Retrofit, APTECH Report AES 95072485-3-1 (August 1996).

Investigation of Lime Kiln Refractory Failure, Continental Lime Nevada, APTECH Report AES 96052754-4-1 (August 1996).

Design Review of Boiler NO_x Modifications, APTECH Report AES 96032689-3-1 (May 1996).

Review Report on NO_x Abatement for Boilers 31F-01, 31F-02 and 31F-03 in Utilities, with S. Kohan, APTECH Report AES 96012634-2-1 (February 1996).

Foster Wheeler Steam Boiler Heat Transfer, Tube Bank Circulations, and Steam Drums Stress Analysis, with M. Cronin, APTECH Report AES 92051695-2-4 (October 1992).

Babcock and Wilcox Cyclone Boiler RBS 4350 MCC/Hour 2620 psi Heat Transfer Calculations, APTECH Report AES 92041678-2-2 (August 1992).

Field Evaluation of Cofiring Gas with Coal for Quantifying Operational Benefits and Emissions Trim in a Utility Boiler, with K. Clark, et al., APTECH Report AES 89021010-6-3 (May 1992).

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 (www.aptecheng.com).