

# THE BOYCE CONSULTANCY GROUP, LLC.

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**DR. MEHERWAN P. BOYCE, P.E., C. Eng.**



## **SPECIFIC AREAS OF PROFESSIONAL INTEREST**

Aerodynamics	Cogeneration
Automotive Engineering	Environmental Engineering
Bio-Engineering	Fluid Mechanics
	TurboMachinery

## **PROFESSIONAL EXPERIENCE**

**Professor Meherwan P. Boyce, PhD, P.E., C.Eng (UK), is the managing Partner of The Boyce Consultancy Group, LLC.** He is a **Fellow ASME (USA), IMechE (UK) & IDGTE (UK); NAFE (USA).** He is also a **Registered Professional Engineer** in the **State of Texas** and a **Chartered Engineer** in the **United Kingdom.** He has 50 years of experience in the field of TurboMachinery in both industry and academia. He is presently and for the past 15 years been Chairman of The Boyce Consultancy Group, LLC. His past experience covers 20 years as Chairman and CEO of Boyce Engineering International Inc., founder of Cogen Technologies Inc., and five years as a designer of compressors and turbines for gas turbines for various gas turbine manufacturers. His academic experience covers a 15 year period, which includes the position of Professor of Mechanical Engineering at Texas A&M University and Founder of the TurboMachinery Laboratories and The TurboMachinery Symposium, which is now in its forty second year. He is the author of several books such as the **Gas Turbine Engineering Handbook** (Third Edition, Elsevier), **Cogeneration & Combined Cycle Power Plants** (Second Edition, ASME Press), and **Centrifugal Compressors, A Basic Guide** (PennWell Books). Professor Boyce is a contributor to several Handbooks; his latest contributions are to the **Perry's Chemical Engineering Handbook Seventh and Eight Editions** (McGraw Hill) in the areas of **Transport and Storage of Fluids, and Gas Turbines, ASME's Energy and Power Generation Handbook, and a handbook on Combined Cycle Systems for near-zero emission power generation.** Dr. Boyce has taught over 150 short courses around the world attended by over 3000 students representing over 400 Corporations.

## **CONSULTING**

Experience assimilated over forty two years of industrial consultation covering a wide range of subjects with Aerospace, Utilities, Offshore and Petrochemical Industries, and TurboMachinery manufacturers. Project Development and Engineering throughout the world including design consultant on compressors and turbines for various manufacturers, such as Dresser, GE, Thomassen, United Technologies, Rolls Royce, and Volvo. Expertise including Heavy Fuels Combustion, Performance Evaluation of Combined Cycle Power Plants, Forensic Engineering and Expert Witness Testimony on Combustion Turbines, and Steam Turbines and Compressors.

### **Research and Design on Various TurboMachinery Components**

- Blade Design
- Impeller Design
- Combustor Design
- Diffuser Design
- Environmental Systems for Aircraft

### **Condition Monitoring**

Pioneer of the introduction of On-Line Performance Monitoring for Large Rotating Machinery in Petrochemical and Utility applications in the world

### **Independent Power Project Development**

- Financial Analysis
- Preliminary Design

### **Combined Cycle and Cogeneration Plants**

- Design
- Performance Testing

### **Heavy Fuel Combustion in Gas Turbine Operation**

- Wet Combustors
- Dry Low NO<sub>x</sub> Combustor

### **Troubleshooting Turbine and Compressor Problems**

### **Educational Programs**

- Gas Turbines
- Turbine and Compressor Design, Operation and Maintenance
- Performance and Testing of Combined Cycle Power Plants
- Combined Cycle & Cogeneration Plants
- Steam Turbines
- Centrifugal Compressors

### **Forensic Engineering and Maintenance Practices**

- Analysis and Expert Testimony
- Maintenance Manuals

**Consultant for Major Utilities and Independent Power Producers, including:**

BAHRAIN	BAHRAIN ELECTRIC
CANADA	NORTHLAND POWER PETRO-CANADA
CHINA	CHINA LIGHT & POWER
COLOMBIA	TERMOFLORES S.A.
FRANCE	ELECTRICITY DE FRANCE
GREECE	PUBLIC POWER CORP.
INDIA	TATA ELECTRIC COMPANIES
MALAYSIA	TENAGA NASIONAL
MEXICO	CFE
NETHERLANDS	EPON
PANAMA	GENA
PAKISTAN	WAPDA
SAUDI ARABIA	SABIC SCECO
SINGAPORE	SINGAPORE POWER
TAIWAN	EVERPOWER
U.A.E.	DUBAI GAS & ELECTRIC DUBAI ALUMINIUM
U.K.	NATIONAL POWER POWERGEN THAMES POWER
U.S.A.	AES WOLF HOLLOW AES RED OAK AMOCO PRODUCTION COMPANY COGEN BLACK AND VEATCH CALPINE CORPORATION CENTRAL HUDSON GAS & ELECTRIC

CRS SIRRINE ENGINEERS, INC  
DESERT POWER, L.P.  
DOW CHEMICAL  
ELECTRIC POWER RESEARCH INSTITUTE  
E.G. & G. IDAHO  
FLORIDA POWER & LIGHT  
FOSTER WHEELER  
GAYLORD CONTAINER COGEN  
GULF STATE UTILITIES  
HARRIS GROUP, INC.  
INLAND CONTAINER COGEN  
OLSEN-BEAL & ASSOCIATES  
PUBLIC UTILITIES BROWNSVILLE  
PRECO TURBINE & COMPRESSOR SERVICES, INC.  
REVAK ENTERPRISES, INC.  
SALT RIVER PROJECT  
SPECIAL PROCESSES OF ARIZONA, INC.  
SOUTHWESTERN PUBLIC SERVICE  
TEXAS UTILITIES ELECTRIC COMPANY  
TRACTEBEL USA  
U.S. DEPARTMENT OF ENERGY  
WATSON ENERGY  
WESTERN ENERGY  
WHEELABRATOR NORWALK ENERGY COMPANY  
WICHITA FALLS ENERGY COMPANY  
ZURN/NEPCO

VENEZUELA            CADAFE, CARACAS  
                             ENELBAR - BARQUISIEMENTO  
                             ENELVEN-MARACAIBO

**Consultant for Major Petrochemical Companies, including:**

CANADA                PETROSAR  
                             POLYSAR  
                             NOVA

FRANCE:                TOTAL

INDIA:                    OFFSHORE NATIONAL GAS CORPORATION

INDONESIA:              MOBIL OIL CORP

MEXICO:                PEMEX

NORWAY:                AMOCO NORWAY OIL COMPANY  
                             NORSK HYDRO

PHILIPS PETROLEUM COMPANY  
STATOIL

PAKISTAN: ESSO FERTILIZER

QATAR: QATAR FERTILIZER CORPORATION  
QATAR GENERAL PETROLEUM COMPANY  
QATAR PETROCHEMICAL COMPANY

SAUDI ARABIA: ARAMCO  
UNIVERSAL OIL PRODUCTION - JEDDAH REFINERY

UAE: DUBAI FERTILIZER  
DUBAI PETROLEUM  
GASCO

U.K.: BRITISH PETROLEUM  
CONOCO  
HAMILTON BROTHERS  
HYDROCARBONS G.B.  
MARATHON OIL  
SHELL CHEMICAL  
SHELL OIL CO.

U.S.A.: ALLIED CHEMICAL CORPORATION  
AMOCO OIL COMPANY  
AMOCO CHEMICALS CORPORATION  
ARCO OIL & GAS ALASKA  
BRIDGELINE GAS HOLDINGS  
COASTAL CHEMICAL CORPORATION  
CHARTER OIL CORPORATION  
COLUMBIA GAS TRANSMISSION CORPORATION COLUMBIA  
NITROGEN CORPORATION  
DOW CHEMICALS CORPORATION  
ENERGAS, A DIVISION OF ATMOS ENERGY  
ENTERPRISE PRODUCTS COMPANY  
EXXON CHEMICAL  
KAISER AGRICULTURE & CHEMICALS  
KAISER ALUMINUM  
KINDER MORGAN ENERGY PARTNERS, L.P.  
OCCIDENTAL CHEMICAL  
PHILLIPS 66  
PRAXAIR, INC  
ROHM & HAAS  
SUN OIL CORPORATION  
STATE OF ALASKA  
UNION CARBIDE CORPORATION

VENEZUELA:           CORPOVEN  
                            LAGOVEN  
                            MARAVEN  
                            MENEVEN  
                            PEQUIVEN

**Consultant for Various Armed Forces and Civil Aviation Companies**

CANADA                PEACE HELICOPTERS

SWEDEN:             ROYAL SWEDISH NAVY

U.K.                   DEFENCE EVALUATION RESEARCH AGENCY

U.S.A.:               CONTINENTAL AIRLINES  
                            U.S. ARMY  
                            U.S. NAVY  
                            U.S. AIRFORCE

**Consultant for Various Government and Trade Agencies**

U.S.A.                DEPARTMENT OF ENERGY  
                            DEPARTMENT OF JUSTICE  
                            ELECTRICAL POWER RESEARCH INSTITUTE

NETHERLANDS:       KEMA

SAUDI ARABIA:       SABIC

**Consultant for the Major TurboMachinery Manufacturers, and Repair Facilities:**

JAPAN                IHI INDUSTRIES  
                            KOBE STEEL  
                            KAWASAKI  
                            MITSUBISHI  
                            TOSHIBA

NETHERLANDS:       THOMASSEN

SWEDEN:             VOLVO AEROSPACE

U.K.:                 JOHN BROWN CORPORATION  
                            ROLLS ROYCE CORPORATION  
                            RUSTON TURBINES

U.S.A.:                    BORGWARNER  
                              CATERPILLAR TRACTOR CORPORATION  
                              DAIMLER CHRYSLER  
                              DELAVAL TURBINES  
                              DRESSER CORPORATION  
                              DRESSER RAND CORPORATION  
                              GENERAL ELECTRIC CORPORATION  
                              HOERBIGER SERVICES LTD.  
                              SIEMENS WESTINGHOUSE POWER CORPORATION  
                              SOLAR TURBINES CORPORATION  
                              UNITED TECHNOLOGIES CORPORATION  
                              HAMILTON STANDARD  
                              TURBO-POWER AND MARINE

**ACADEMIC EXPERIENCE**

**BOARD OF VISITORS - UNIVERSITY OF OKLAHOMA**

1998- Present    Department of Mechanical and Aerospace Engineering

**BOARD OF VISTORS – SOUTHWEST TEXAS STATE UNIVERISTY**

1995-Present    Department of Computer Science

**TEXAS A&M UNIVERSITY – COLLEGE STATION, TEXAS**

1972-1981	Founding Director	TurboMachinery Laboratories
1972-1981	Founding Chairman	TurboMachinery Symposium
1978-1981	Professor	Mechanical Engineering
1973-1978	Associate Professor	Mechanical Engineering
1969-1973	Assistant Professor	Mechanical Engineering

**UNIVERSITY OF OKLAHOMA**

1967-1969    Instructor                    Aerospace and Mechanical Engineering

**INDUSTRIAL EXPERIENCE**

**THE BOYCE CONSULTANCY GROUP, LLC**

1997-Present    Chairman

International Management Consultation and Development of Independent Power Projects.

Consulting and Technical Support for the Power and Petrochemical Industry.

Forensic Engineering in Rotating Equipment and Major Prime Movers.

**BOYCE ENGINEERING INTERNATIONAL, INC. – HOUSTON, TEXAS**

1977 – 1997    Chairman of the Board and Chief Executive Officer

Responsible for the overall strategy, planning and direction of the Company. Annual sales of over \$ 5 million and 50 employees. Product line sold September 1997

**1985-1990    COGEN TECHNOLOGIES INC. – HOUSTON, TEXAS**

Founder of the company and Director of Technology. Responsible for development and engineering of Cogeneration Plants.

**FAIRCHILD HILLER CORPORATION – BAYSHORE, NEW YORK**

1966-1967 Group Leader, Aerodynamics

**CURTISS WRIGHT CORPORATION – WOODRIDGE, NEW JERSEY**

1965-1966 Group Leader, Compressor Design

**CUMMINS ENGINE CORPORATION – COLUMBUS, INDIANA**

1964-1965 Project Engineer, Turbocharger, Fuel Injection Development

**JOY MANUFACTURING CORPORATION – BUFFALO, NEW YORK**

1963-1964 Analytical Engineer

**GENERAL TURBINE CORPORATION – BUFFALO, NEW YORK**

1962-1963 Project Engineer

**AWARDS**

**ENGINEERING AWARDS**

2016-Clifford C. Furnas Memorial Award, for the Outstanding Engineering Alumni State University of New York at Buffalo, NY.

2009-ASME Dedicated Service Award-Devotion, Leadership and Performance

2004-Best Technical Paper Award – Electric Power Committee, IGTI, 2004

2002-Key Note Speaker ASME Joint Power Conference Phoenix Arizona June 2002

1996-Best Technical Paper Award – Pipelines & Compressors Committee, IGTI, 1996

1980 Award for Outstanding Achievement' Texas A&M University, Turbomachinery, Laboratory

1974 - Recipient of the Herbert Allen Award for Excellence. Awarded for Aerodynamics and advancing the profession technically more than any other member in the Section

1973 – Recipient of the National Ralph Teetor Award for Outstanding Young Engineers and Researchers.

**FELLOW AWARDS**

January 2010-Elected Fellow -National Academy of Forensic Engineers USA,

February 2008 - Elected Fellow-Institution of Mechanical Engineers, UK

July 1999- Elected Fellow - Institution of Diesel and Gas Turbine Engineers, UK.

June, 1985- Elected Fellow - American Society of Mechanical Engineers, USA, --

**DISTINGUISHED AWARDS**



Who's Who in America in the South and Southwest

International Who's Who

Distinguished Americans for Contribution in Engineering

**EXPORT AWARDS**

SMALL BUSINESS ADMINISTRATION - U S DEPARTMENT OF COMMERCE

EXPORTER OF THE YEAR AWARDS

1996

DISTRICT AWARD: HOUSTON

1996

STATE AWARD: TEXAS

1996

REGIONAL AWARD: SOUTHWEST USA

1996

**PROFESSIONAL LICENSES**

Registered Professional Engineer: Texas No. 30135  
Chartered Engineer in the United Kingdom No. 569278

**PROFESSIONAL AND SCIENTIFIC MEMBERSHIPS**

- American Society of Mechanical Engineers (Fellow)
- Institution of Mechanical Engineers (Fellow)
- Institution of Diesel and Gas Turbine Engineers (Fellow)
- The Association of Energy Engineers
- International Gas Turbine Institute
- National Society of Professional Engineers
- National Academy of Forensic Engineers (Fellow)
- Society of Automotive Engineers
- Sigma XI
- Pi Tau Sigma
- Tau Beta Pi
- Phi Kappa Phi

**COMMITTEES**

- Member, Appointed to the New ASME Ethics Committee, 2012- Present
- Member, Secretary, ASME Committee on Ethical Standards & Review 2009-2011
- Member ASME Nominating Committee May 2008-2010
- Technical Program Chair Manufacturing Group ASME IMECE 2005, 2006
- Chairman, ASME, Plant Engineering and Maintenance Division- July 2003 –June 2005
- Chairman, ASME, Conferences Committee, July 2003 - Present
- Chairman, Gas Turbine Users Conference- April 2002-Present

- Chairman, DOE Condition Monitoring Conference- February 2002-Present
- Chairman ASME-IGTI - Electric Power Committee June 2003- Present
- Vice Chairman- IGTI - Electric Power Committee- June 2001- June 2003
- Chairman, International Power and Petrochem Consortium 2000-Present
- Member ASME PTC 55 Aircraft Engine Performance (Codes) July 2001-Present
- Member ASME- IGTI – Controls Committee
- Member ASME – IGTI- Aircraft Committee
- Member ASME – IGTI – Pipelines and Petrochemicals Committee
- Chair ASME – IGTI –Membership Committee 1990 -1996
- Program Chair ASME – IGTI Annual Expo & Conference Houston, TX 1975
- Chair ASME- IGTI- Technology Resource Committee 1974 -1978
- Member ASME – IGTI Education Committee 1970-1980
- Member ASME – IGTI -Electric Utilities and Co-generation Committee
- Member ASME – IGTI Turbomachinery Committee 1964-1980
- Texas A&M TurboMachinery Symposium–Advisory Committee Member: 1972-Present (Appointed Life Member of the Committee in 2005)
- Co-Chairman, Standardization and Condition Monitoring Workshop-1991
- Chairman, Texas A&M TurboMachinery Symposium–Advisory Committee: 1972-1980
- International Machinery Monitoring and Diagnostic Conference-Advisory Board
- SAE Condition Monitoring
- ISO Subcommittee 5 TC 108

### EDUCATION

- Mechanical Engineering, Ph.D.--University of Oklahoma, 1969
- Mechanical Engineering, M.S.--State University of New York at Buffalo, 1964
- Mechanical Engineering, B.S.--South Dakota School of Mines and Technology, 1962

### BOOKS

ASME PTC 55 Gas Turbine Aircraft Engines, Chair of the committee approved as an American National Standard by the ANSI Board of Standards Review on July 29<sup>th</sup> 2013.

Combined Cycle Systems for Near Zero Emissions Power Generation, Chapters 1 and 2, February 2012, Woodhead Publishing, UK

Gas Turbine Engineering Handbook, Chinese Edition Published in China by Petroleum Industry Press Letter, under special arrangement with Elsevier (Singapore) Pte. Ltd., 2012, (**Sole Author**)

Gas Turbine Engineering Handbook, Fourth Edition, Elsevier Publisher, December 2011, Butterworth-Heinemann Publisher, First Edition 1985 (**Sole Author**)

Energy & Power Generation Handbook, December 2011 American Society of Mechanical Engineers Chapter 27: Combined Cycle Power Plants,

Cogeneration and Combined Cycle Power Plants. Second Edition April 2010; First Edition January 2002, New York. ASME Press. (**Sole Author**)

Perry's Chemical Engineering Handbook, Chapter 10, Transport and Storage of Fluids, 8th. edition, McGraw Hill, 2008.

The Gas Turbine Handbook US Department of Energy Office of Fossil Energy National Energy Technology Laboratory, Axial Flow Compressors Section 2.0, 2006

Centrifugal Compressor: A Basic Guide. PennWell Press February 2003 Tulsa OK. (**Sole Author**)

Gas Turbine Engineering Handbook. Third Edition, Elsevier Publisher, February 2006, Second Edition, Butterworth-Heinemann Publisher, December 2001, First Edition 1985 (**Sole Author**)

Perry's Chemical Engineering Handbook. 7th. edition, Chapters 10 and 14 on Fluid Machines and Gas Turbines., McGraw Hill: 1997.

Gas Turbine Engineering Handbook. German Edition, Springer Verlag, Berlin, Germany: 1997. (**Sole Author**)

Gas Turbine Engineering Handbook. 5th. Printing. January 1992, Houston: Gulf Publishing, 1987. (**Sole Author**)

TurboMachinery Maintenance Handbook. Houston: Boyce Engineering International, 1983 (**Sole Author**)

Centrifugal Compressor Handbook. Houston: Boyce Engineering International, 1981. (**Sole Author**)

Air Movement and Vacuum Devices. Process Equipment Series. 2 vols. Connecticut: Technomic Publishing, 1981.

### **PATENTS**

- United States Patent 3,930,742  
Meherwan P. Boyce January 6, 1976  
Velocity probe for compressor surge control
- United States Patent US 2008/0245052 A1  
Meherwan P. Boyce October 9, 2008  
Integrated Biomass Energy System

### **PUBLIC SERVICE**

Member, Development Board, 2011-Present, **University of Texas Medical Branch (UTMB)-Health**, Galveston, Texas

Board of Trustees, 2010 – Present, **Houston Symphony**, Houston, Texas.

Member, Board of Directors, 2004 – Present. **The Sam Houston Chapter of the Boy Scouts of America**. Holder of the Bharat Scout (India's Equivalent to Eagle Scout)

Vice President, 1991 – Present. **World Zoroastrian Organization.** London, United Kingdom

Chairman of the Board, 2000-Present, **The Virtuosi of Houston.** A Young Artist's Chamber Orchestra.

Board of Directors -President 2008-2011- Palisade Palms Condominium

Board of Advisors, 2008-2011. **University of Texas, Health Center, Houston, Texas**

Chair of the Advisory Council. 2010-2011 **University of Texas Dental Branch** Houston Texas.

Founder Director 2001 of the **World Zoroastrian Chamber of Commerce.** The chamber has now has chapters in several countries around the world.

President 1994 – 2006. **The Houston Galveston Stavanger Sister City Society.** A City of Houston Sister City Program for Developing Trade and Education with an active Student Exchange program, with Stavanger, Norway.

Member, Board of Advisors. 1995-1997. **Global Children's Foundation.** A foundation created by Nobel Peace Prize Laureate Ms. Betty Williams to create a Marshal plan for children in war torn countries

Member, Board of Directors. 1993-1999. **The US Committee of UNICEF.** Houston, Texas

Member, Executive Board. 1993 – 1995. **Wilhelm Schole International,** Houston, Texas. A unique private school dedicated to all children. The school is renowned for its multi-cultural curriculum.

Member, Executive Board. 1993 – 1995. **Zoroastrian Association of Houston.** Houston, Texas.

Chairman, **7th North American Zoroastrian Congress** – 2000 Houston, Texas.

## PUBLICATIONS

### TECHNICAL

- Boyce, M. P., Monitoring Combined Cycle Performance Guideline for Tracking of Common Performance Degradation Modes. Published by the Electric Power Research Institute (EPRI) December 2013
- Boyce, M. P., The Growth of Gas Turbine Technology for Combined Cycle Power Plants over the Past Ten Years, Keynote Speaker November 6, 2013, 7<sup>th</sup> International Gas Turbine Conference-International Diesel and Gas Turbine Establishment, Milton Keynes, England, U.K..
- Boyce, M. P., Failures in Compressors of Advanced Gas Turbines, Modern Power Systems, Pgs 30-37 November 2012
- Boyce, M. P., The Testing of Gas Turbines, ASME Power 2007, San Antonio, Texas, July 2007
- Boyce, M. P., Advanced Axial Flow Turbines, March/April 2007 Turbomachinery International, Pg 40-41, July/August 2006
- Boyce, M. P., Combined Cycle Power Plants, Power and Energy International, Pg 34-35 Nov/Dec 2006
- Boyce, M. P., Maintaining Combustors-New Designs Reduce Emission But Require Additional Care, Turbomachinery International, Pg 34-35 Nov/Dec 2006
- Boyce, M. P., Recovering Performance Compressor Operation and Maintenance is Crucial to Regaining Losses in Gas Turbine Efficiency and Output, Turbomachinery International, Pg 6-7 July/August 2006
- Boyce, M. P., Performance Characteristics Of Advanced Gas Turbine Cogeneration Power Plants ASME – IMECE 2005-82325 Proceedings of International Mechanical Engineering Congress and Exposition, Orlando Florida. November 2005
- Boyce, M. P., Francisco Gonzales, A Study of On-Line and Off-Line Turbine Washing to Optimize the Operation of a Gas Turbine, ASME – GT -2005-69126, Reno, Nevada. June 2005. Also published in the Journal of Turbomachinery June 2006 GTP-05-1136
- Boyce, M. P., They Don't Make 'Em Like That Anymore "Reliability, Availability, Maintainability of Advanced Gas Turbines" Turbomachinery International, September/October 2004, Vol.45 No.5 Pg. 16
- Boyce, M. P., Jeffery N. Phillips, Jay Grandmont, Leonard Angelo, Simplified On-Line Performance Monitoring of Simple Cycle Gas Turbines using Spreadsheet based Calculation, ASME – GT -2004-54123, Vienna, Austria. June 2004.
- Boyce, M. P., Operation of Combined Cycle Power Plants ASME Vienna Austria. June 2004.

- Boyce, M. P., Long Term Service Agreements for Large Combined Cycle Power Plants, ASME Vienna Austria. June 2004.
- Boyce , M. P., Operation of New Advanced Gas Turbines for Combined Cycle Power Plants ASME Power Conference Baltimore, MD. April 2004
- Boyce , M. P., Long Term Service Agreements for New Advanced Gas Turbine Power Plants ASME Power Conference Baltimore, MD. April 2004
- Boyce, M. P., Identification and Correction of Machinery Losses by Modeling Plant Thermodynamics of Combined Cycle Power Plants. IDGTE Gas Turbine Conference, Milton Keynes, U.K. October 2003
- Boyce, M. P., Increase in Availability and Reliability of Combined Cycle Power Plants, ASM International Conference on Combustion Turbines and Hot Section Components, Conference Proceedings, Pittsburgh PA. October 2003
- Boyce, M. P., Latcovich, Jr., John A., Condition Monitoring and Its Effect on the Life of New Advanced Gas Turbines, ASME -IGTI, Global Gas Turbine News Volume 42: 2002, No. 3 Page 4, November 2002
- Boyce, M. P., A Compendium of Condition Monitoring for New Advanced Gas Turbines, Imperial College, October 2002
- Boyce, M. P., Latcovich, Jr., John A., Condition Monitoring and Its Effect on the Life of New Advanced Gas Turbines, Gas Turbine Users Conference, Houston TX. April 2002
- Boyce, M. P., Advanced Condition Monitoring For Advanced Gas Turbines, EPRI Conference, International Conference on Advances In Life Assessment and Optimization of Fossil Power Plants Orlando FL., March 2002.
- Boyce, M. P., Assessments of Trends in Condition Monitoring Systems and Life Cycle Cost Management for Combined Cycle Power Plants, DOE, Advanced Gas Turbine and Condition Monitoring Conference and Workshop, February 2002.
- Boyce, M. P., Assessments of Trends in Condition Monitoring Systems and Life Cycle Cost Management for Combined Cycle Power Plants, DOE Morgantown December 2001
- Boyce, M. P., Turbomachinery in the Next Millennium, Gas Turbine Symposium, Sponsored by the Institute of Diesel and Gas Turbine Engineers, Milton Keynes, England, UK, September 2001
- Boyce, M. P., New Trends In Gas Turbines a Seminar Naval Post Graduate School, Monterey CA, July 2001

- Boyce, M. P., Reliability, Availability, and Maintainability Program for Advanced Gas Turbines in Combined Cycle Applications, US. DOE. Next Generation Turbine Stakeholder Meeting, April 9-10, 2001
- Boyce, M. P., "Turbo Machinery in the next Millennium" ASME – IGTI January 2001
- Boyce, M. P., Advanced Cycles for Combined Cycle Power Plants, Russia Gas Turbo-Technology Publication, November-December 2000
- Boyce, M. P., Turbo-Machinery for the Next Millennium, Russia Gas Turbo-Technology Publication, September-October 2000
- Boyce, M. P., Gonzales F.J. " Solutions to Field Problems of a Gas Turbine-Axial Flow Chemical Process Compressor Train based on Computer Simulation of the Process" Proceedings of the 28th. TurboMachinery Symposium, Texas A & M University, September, 1999. pp 89-104.
- Boyce, M. P., "Managing Power Plant Life Cycle Costs", Russia Gas Turbo-Technology Publication, January - February 2000
- Boyce, M. P., "Performance Characteristics of a Steam Turbine in a Combined Cycle Power Plant" Proceedings of the 6th. EPRI Steam Turbine Generator Workshop August 1999.
- Boyce, M. P., "Cutting Edge Turbine Technology" Middle East Electricity October/November 1999
- Boyce, M. P., "Condition Monitoring of Combined Cycle Power Plants" Asian Electricity July/August 1999, pp35-36
- Boyce, M. P., "Managing Power Plant Life Cycle Costs" International Power Generation, July 1999, pp 21-23.
- Boyce, M. P., "Performance Monitoring of Large Combined Cycle Power Plants" Proceedings of the ASME 1999 International Joint Power Generation Conference, July 1999, San Francisco CA. Volume 2 pp 183-190.
- Boyce, M. P., "How to Identify and Correct Efficiency Losses through Modeling Plant Thermodynamics" Proceedings of the CCGT Generation Power Conference, March, 1999, London U.K.
- Boyce, M. P., "Total Performance Condition Monitoring Of Major Petrochemical Facilities" Presented at the Materials, Selection and Application in the Chemical Process Industry Seminar, London, UK, Sponsored by The Institute of Materials, and co-sponsored by Institute of Chemical Engineers, and the Institute of Corrosion, November 1998.
- Boyce, M.P., "The Economics of Captive Power Plants." – Presented at Power in the Gulf conference in December 1997.

- Boyce, M.P. and Cox, William M. "Condition Monitoring Management-Strategy." – Presented at The Intelligent Software Systems in Inspection and Life Management of Power and Process Plants in Paris, France, August 1997.
- Boyce, M.P. and Venema, J. Condition Monitoring and Control Center – Presented at the Power Gen Europe in Madrid, Spain, June 1997.
- Boyce, M.P., "Improving Performance with Condition Monitoring" – Power Plant Technology Economics and Maintenance, March/April 1996, pp. 52-55.
- Boyce, M.P., "Control and Monitoring an Integrated Approach." Presented at Middle East Electricity, December 1994, pp. 17-20.
- Boyce, M.P., Meher-Homji, C.B, Lakshminarasimha, A.N., Gas Turbine and Combined Cycle Technologies for Power and Efficiency enhancement in Power Plants ASME 94-GT-435
- Boyce, M.P., Gabriles, G.A. and Meher-Homji, C.B. "Enhancing System Availability and Performance in Combined Cycle Power Plants by the Use of Condition Monitoring." Presented at the European Conference and Exhibition Cogeneration of Heat and Power. Athens, Greece. 3-5 Nov. 1993.
- Boyce, M.P. and Herrera, G. "Health Evaluation of Turbine Engines Undergoing Automated FAA Type Cyclic Testing." Presented at the SAE International Ameritech '93. Costa Mesa, CA, 27-30 Sept. 1993. SAE Paper No. 932633.
- Meher-Homji, C.B., Boyce, M.P. Lakshminarasimha, A.N., Whitten, J.A. and Meher-Homji, F.J. Condition Monitoring and Diagnostic Approaches for Advanced Gas Turbines." Proc. ASME Cogen Turbo Power 1993. 7th Congress and Exposition on Gas Turbines in Cogeneration and Utility. Sponsored by ASME in participation of BEAMA. IGTI-Vol. 8 Bournemouth, United Kingdom. 21-23, Sept. 1993. pp. 347-55.
- Boyce, M.P., Gabriles, G.A., Meher-Homji, C.B., Lakshminarasimha, A.N. and Meher-Homji, F.J. "Case Studies in Turbomachinery Operation and Maintenance using Condition Monitoring." Proc. of the 22nd Turbomachinery Symposium. Dallas, TX. 14-16 Sept. 1993. 101-12.
- Boyce, M.P., "Principles of Operation and Performance Estimation of Centrifugal Compressors." Prod. of the 22nd Turbomachinery Symposium. Dallas, TX. 14-16 Sept. 1993. 161-78.
- Boyce, M.P., Meher-Homji, C.B., and Lakshminarasimha, A.N. "Evolution of a Unified Turbomachinery Condition Monitoring System and its Application to Gas and Steam Turbine Utility Plants." Proc. of 3rd EPRI Steam Turbine/ Generator Workshop. Albany, NY. 20-23 July 1993.
- Boyce, M.P., "Turbomachinery Condition Monitoring Systems for the Hydrocarbon Processing Industry." Hydrocarbon Technology International Magazine. 26-27 June 1993.



- Boyce, M.P., Lakshminarasimha, A.N., and Meher-Homji, C.B. "Design and Implementation of an advanced Multi-Machine Gas Turbine Train Condition Monitoring and Control system." Presented at the Third Congress of Turbomachinery. Queretaro, Mexico. Dec. 1992.
- Lakshminarasimha, A.N., Boyce, M.P. and Meher-Homji, C.B. "Modeling and Analysis of Gas Turbine Performance Deterioration." Presented at the 37th ASME International Gas Turbine and Aeroengine Congress and Exposition. Cologne, Germany. 1-4 June 1992. ASME Paper No. 93-GT-395.
- Boyce, M.P., "Performance Monitoring of Cogeneration Facilities." Presented at the 1st International POWER Technology Exposition and Conference. McCormick Place, Chicago. Oct. 31-Nov. 2, 1989.
- Boyce, M.P. and Echegaray, L.E. "Aerothermal Analysis Improves Efficiency and Availability of TurboMachinery." Plant Services Handbook of Computerized Maintenance Management and Predictive Maintenance. Oct. 1989, pp.102-104.
- Barnes, G., Boyce, M.P., Wooldridge, B. and Meher-Homji, C.B. "On-Line Condition Monitoring of Two Westinghouse CE 352 Gs Turbine Compressor Sets." Proc. of the 8th NRCC Symposium on Industrial Application of Gas Turbines. Ottawa, Canada, 24-27 Sept. 1989. 85-98.
- Boyce, M.P., Bhargava, R.K. and Chinoy, R. "On-Line Condition Monitoring of TurboMachinery." Proc. of the 1st International Machinery Monitoring and Diagnostic Conference. Las Vegas, NV. 11-14 Sept. 1989. 419-27.
- Boyce, M.P., Meher-Homji, C.B. and Wooldridge, B. "Condition Monitoring of Aero-derivative Gas Turbines." Presented at the Gas Turbine and Aeroengine Congress and Exposition. Toronto, Canada. 4-8 June 1989. ASME Paper No. 89-GT-36.
- Boyce, M.P., Meher-Homji, C.B. and Mani, G. "A Diagnostic Methodology for Condition Monitoring of High Speed TurboMachinery." Presented at the Society of Tribologists and Lubrication Engineers Conference. Atlanta, GA. 1-4 May 1989. Publication No. STLE SP-27.
- Boyce, M.P., "Rerating of Centrifugal Compressors-Part II." Diesel and Gas Turbine Worldwide. Jan.-Feb. 1989. 8-20.
- Unsal, R. and Boyce, M.P. "Experience with On-Line Condition Monitoring System." Proc. of the 17th TurboMachinery Symposium. Dallas, TX. 8-10 Nov. 1988. pp.57-66.
- Boyce, M.P., "Rerating of Centrifugal Compressors-Part I." Diesel and Gas Turbine Worldwide. Oct. 1988. 46-50.
- Boyce, M.P., "Advanced Condition Monitoring Protection and Control of TurboMachinery." Presented at the BHRA Conference. Milton Keynes, U.K. 27-28 Oct. 1988. Paper C-4.

- Boyce, M.P., “Advanced Maintenance Management System Design for the LM2500 Gas Turbine.” Presented at the SAE Conference and Exposition on Future nTransportation Technology. San Francisco, CA. Aug. 1988. SAE Paper No. 881171.
- Boyce, M.P., “Advanced Monitoring Protection and Control of TurboMachinery.” Diesel and Gas Turbine Worldwide. May 1988.
- Boyce, M.P., “Rerating of Centrifugal Compressors.” Proc. of the 16th Texas A&M TurboMachinery Symposium. Dallas, TX. 27-29 Oct. 1987.
- Boyce, M.P., “Higher Availability and Efficiency Using On-Line Real Time Diagnostic and Prognostic System on Gas Turbine Compressor Trains.” Presented at the ASME Beijing International Gas Turbine Symposium and Exposition. 1-7 Sept. 1985.
- Boyce, M.P., Bowman, J.C., Meher-Homji, C.B. and Focke, A.B. “Energy Efficient Operation of Gas Turbine Compressor Sets.” Presented at the ASME Gas Turbine Conference and Exhibit. Houston, TX. 18-21 Mar. 1985. Publication No. 85-GT-78.
- Boyce, M.P., Meher-Homji, C.B. and Focke, A.B. “An Overview of Cogeneration Technology-Design Operations and Maintenance.” Proc. of the 13th TurboMachinery Symposium. Houston, TX. 13-15 Nov. 1984. 3-24.
- Boyce, M.P., Meher-Homji, C.B., Focke, A.B. and Bowman, J.D. “Detection of Turbomachine Blading Problems Using On and Off-Line Analysis.” Proc. of the EPRI Conference. Incipient Failure Detection in Power Plants. Buena Vista, FL. 10-12 Oct. 1984.
- Boyce, M.P., Bohannan, W.R., Brown, R.N., Gaston, J.R., Meher-Homji, C.B., Meier, R.H. and Pobanz, N.E. “Practical Aspects of Centrifugal Compressor Surge and Surge Control Systems.” Proc. of the 12th TurboMachinery Symposium. Houston, TX. 15-17 Nov. 1983. 147-73.
- Boyce, M.P., Meher-Homji, C.B. and Mani, G. “The Development and Implementation of Advanced On-Line Monitoring and Diagnostic Systems for Gas Turbines.” Presented at the 1983 GTSJ Tokyo International Gas Turbine Congress. Tokyo, Japan. 23-29 Oct. 1983. Paper No. 83-Tokyo-IGT-94.
- Boyce, M.P., Mani, G. and Meher-Homji, C.B. “Reliability Improvement of Aerothermal Analysis of High Speed Rotating Machinery.” Presented at the Design and Production Engineering Technical Conferences, ASME. Dearborn, MI. 11-14 Sept. 1983. 89-96.
- Boyce, M.P., Meher-Homji, C.B., Mani, G., Lam, T. and Ansell, R. “Operating Experience with Health Monitoring and Diagnostics of M.D. Steam Turbines and Centrifugal Compressors.” Presented at the ASME Joint Power Gen. Conference (JPGC). Sept 1983. Publication No. 83-JPGC-PWR 28. 1-8.
- Boyce, M.P., “Äerothermodynamic Gas Path Analysis for Health Diagnostics of Combustion Gas Turbines and Centrifugal Compressors.” Presented at the ASME Joint Power Gen. Conference (JPGC). Sept 1983. Publication No. 83-JPGC-PWR 28. 1-8.

- Boyce, M.P., “Aerothermodynamic Gas Path Analysis for Health Diagnostics of Combustion Gas Turbines.” Presented at the 36th Meeting on Detection, Diagnosis and Prognosis, Mechanical Failures Prevention Group. Scottsdale, AZ. Dec 1982.
- Boyce, M.P. and Meher-Homji, C.B. “Aerothermal-Mechanical Health Monitoring and Diagnostics of Turbo-Compressor Sets.” Proc. of the 11th TurboMachinery Symposium. Houston, TX. 14-16 Dec. 1982. 75-94.
- Boyce, M.P., “On-Line Monitoring and Diagnostics of Power Plants.” Proc. of the EPRI Workshop on Incipient Failure Detection, 1982.
- Boyce, M.P., “The Design and Development of an External Fired Steam Injected Gas Turbine.” Proc. Of the Industrial Energy Conservation Technology Conference. March 1981.
- Boyce, M.P., “Mechanical and Aerothermal Diagnostics of TurboMachinery.” Proc. of the 32<sup>nd</sup> Mechanical Failures Prevention Group. October 1980.
- Boyce, M.P., Vyas, Y.K. and Trevillion, W.L. “The External Combustion Steam Injection Gas Turbine for Cogeneration.” Proc. of the 13th Intersociety Energy Conversion Engineering Conference. Vol. 1 SAE P-75. San Diego, CA. 20-25 Aug. 1978. Paper No. SAE 789534. 860-865.
- Boyce, M.P., “How to Achieve On-Line Availability of Centrifugal Compressors.” Chemical Engineering. June 1978.
- Boyce, M.P., Trevillion, W.L. and Hoehing, W.W. “Vaporized Fuel Oil...A New Gas Turbine Fuel.” Diesel and Gas Turbine Progress. Mar 1978.
- Boyce, M.P., Trevillion, W.L. and Wohlschlegel, D. “A Viscous Flow Model for TurboMachinery.” Proc. of the 1st International Conference on Centrifugal Compressor Technology. The Department of Science and Technology, Government of India, New Delhi. 20-23 Feb. 1978. A6-25.
- Boyce, M.P., “Dynamic Simulation of High Speed Rotating Machinery.” Presented at the ASME Energy Technology Conference, September, 1977.
- Boyce, M.P. and Nishida, A. “Investigation of Flow in Centrifugal Impeller with Tandem Inducer.” Prod. of the Tokyo Joint Gas Turbine Congress (sponsored by ASME, JSME and GTSJ). Tokyo, Japan. 22-27 May 1977. 353-62.
- Boyce, M.P., “Secondary Flows in Axial Flow Compressors with Treated Blades.” Proc. of the 49<sup>th</sup> Meeting of the AGARD Propulsion and Energetics Panel. Koninklijk Instutuut van Ingenierus. The Hague, The Netherlands. 28-30 March 1977. 5-1-13.

- Boyce, M.P., “The Role of a Spectrum Analyzer in the Performance and Maintenance Monitoring of High Speed TurboMachinery.” Presented at the Vibration Institute Seminar on Machinery Preventive Maintenance and Fault Diagnosis. Houston, TX. Jan.-Feb. 1977.
- Boyce, M.P., “Spectrum Analysis-A Diagnostic Tool for High Speed Rotating Machinery.” Presented at the 92nd Meeting of the Acoustical Society of America. San Diego, CA, 14-19 Nov. 1976.
- Boyce, M.P., Trevillion, W.L. and Brown, M.L. “Advanced Research Programs in TurboMachinery.” Proc. of the 5th TurboMachinery Symposium. College Station, TX. 12-14 Oct. 1976. 31-44.
- Boyce, M.P., Bayley, R.D., Vankayalapati, S. and Vijayvardhan, E. “Field Testing of Compressors.” Proc. of the 5th TurboMachinery Symposium. College Station, TX. 12-14 Oct. 1976. 149-59.
- Boyce, M.P., “Monitoring of TurboMachinery.” Technical Bulletin. Texas Engineering Experimental Station, Texas A&M University. College Station, TX. Oct. 1976
- Boyce, M.P. and Brown, M.L. “Liquid Fuel Applications in Gas Turbines.” Presented at the 1st. Symposium Venezolano de Turbines de Gas. Caracas, Venezuela. 26-29 April 1976.
- Boyce, M.P. and Vijayvardhan, E. “Trends in TurboMachinery Research.” Presented at the Short Term Course on Gas Turbine Engineering. Indian Institute of Technology. Madras, India. Dec. 1975.
- Boyce, M.P., “Spectrum Analysis for TurboMachinery.” Presented at the 2nd Annual Rerating Machinery Engineers’ Senior Orbits Symposium. South Lake Tahoe, NV. June 1975.
- Boyce, M.P. and Hanawa, D.A. “Parametric Study of a Gas Turbine.” Presented at the Gas Turbine Conference. Houston, TX. 2-6 March 1975. 1-9. ASME Paper No. 75-GT-46.
- Boyce, M.P. and Hanawa, D.A. “Development of Techniques for Monitoring TurboMachinery.” Presented at the Gas Turbine Operations and Maintenance Symposium. Edmonton, Alberta, Canada. Oct. 1974.
- Boyce, M.P. and Chen, Mow-Shung. “Optimization of Various Gas Turbine Cycles.” Proc. of the 3<sup>rd</sup> TurboMachinery Symposium. College Station, TX. 15-17 Oct. 1974. 91-100.
- Boyce, M.P., “Aerodynamic Characteristics of the Flow in the Clearance between the Impeller and the Casing.” Presented at the IV USSR’s National Scientific Conference on Compressors. Cyma, Russia. Sept. 1974.
- Boyce, M.P., “Engineering Education in Turbomachinery.” Presented at the ASME Gas Turbine Conference and Products Show. Zurich, Switzerland. March 30-April 4, 1974. ASME Paper No. 74-GT-86.
- Boyce, M.P., Schiller, R.N. and Desai, A.R. “Study of Casing Treatment Effects in Axial Flow Compressors.” Presented at the ASME Gas Turbine Conference and Products Show. Zurich, Switzerland. March 30-April 4, 1974. ASME Paper No. 74-GT-89.

- Boyce, M.P., "Total Energy for Texas A&M." Gas Turbine International. Sept - Oct. 1973.
- Boyce, M.P. and Desai, A.R. "Clearance Loss in a Centrifugal Impeller." Presented at the Intersociety Energy Conversion Conference. Pittsburgh, PA. August 1973
- Boyce, M.P., "Exhaust Gas Pollution Control at the Laredo, Texas Border Inspection Station." Presented at the ASME Symposium of Flow Studies in Air and Water Pollution. Atlanta, GA. June 1973.
- Boyce, M.P. and Desai, A.R. "A Theoretical Analysis of Non-Isentropic Flow of a Compressible Viscous Gas in a Narrow Passage." Presented at the International Lubrication Conference. New York, NY. Oct. 1972.
- Boyce, M.P., "New Development in compressor Aerodynamics." Prod. Of the 1st TurboMachinery Symposium. College Station, TX. 24-26 Oct. 1972. 79-89.
- Boyce, M.P. and Bale, Y.S. "Diffusion Loss in a Mixed Flow Impeller." Presented at the 7th Intersociety Energy Conversion Engineering Conference. San Diego, CA. Sept. 1972.
- Boyce, M.P., "Air Pollution Control of the Laredo Customs Station." Government Services Administration. Texas A&M University. College Station, TX. Sept. 1972
- Boyce, M.P. and Bale, Y.S. "Feasibility Study of a Radial Inflow Compressor." Presented at the ASME International Gas Turbine and Fluids Engineering Conference. San Francisco, CA. 26-30 March 1972. ASME Paper No. 72-GT-52.
- Boyce, M.P. and Neely, P.F. "Decay of Swirl in Turbulent Two Phase Flow." Presented at the 8<sup>th</sup> Southeastern Seminar on Thermal Sciences. Nashville, TN.
- Boyce, M.P. and Bale, Y.S. "A New Method for the Calculation of Blade Loadings in a Radial Flow Compressor." Presented at the ASME Gas Turbine Conference and Products Show. Houston, TX. March 28-April 1, 1971. ASME Paper No. 71-GT-60.
- Boyce, M.P., "The Utilization of Internal Combustion Exhaust Gases for Air Conditioning." Proc. of the 1971 Intersociety Energy Conversion and Engineering Conference. Boston, Mass. 3-5 Aug. 1971. Paper No. 719162. 1240-48.
- Boyce, M.P. and Blick, E.F. "Skin Friction Drag and Velocity Profile Measurement Techniques in Two-Phase Flow." Presented at the ASME Fluids Engineering Conference. Pittsburgh, PA. 9-12 May 1971. ASME Paper No. 71-FE-32.
- Boyce, M.P. and Bale, Y.S. "A New Method for the Calculation of Blade Loadings In Radial Flow Compressors." Presented at the 16th International Gas Turbine Conference. Houston, TX. March 1971. ASME Paper No. 71-GT-60.

- Boyce, M.P., “Design of Compressor Blades Suitable for Transonic Axial Flow Compressors.” Presented at the International Gas Turbine Conference. Houston, TX.
- Boyce, M.P., “A Practical Three-Dimensional Flow Visualization Approach to the Complex Flow Characteristics in a Centrifugal Impeller.” Presented at the ASME International Gas Turbine Conference. Zurich, Switzerland. ASME Paper No. 66-GT-83.
- Boyce, M.P. and Blick, E.F. “Fluid Flow Phenomena in Dusty Air.” Presented at the ASME Winter Annual Meeting, Los Angeles, CA, 16-20 November 1969. ASME Paper No. 69-WA/FE-24.
- Boyce, M.P., “Design of Compressor Blades Suitable for Transonic Axial-Flow Compressors.” Presented at the ASME Gas Turbine and Conference Show. Houston, TX. 5-9 March 1967. ASME Paper No. 67-GT-47.
- Boyce, M.P., “Visualization of Three-Dimensional Flow in a Centrifugal Impeller.” Thesis, State University of New York. Buffalo, NY, 1964.

### REPORTS

Analysis of a Geo-Thermal Plant, January 2016,

Analysis of a Combined Cycle Power Plant (CCPP) for Mitsubishi Hitachi Power Systems (MHPS), Singapore, January 2015

Root Cause Analysis SGT 700A Gas Turbine Failure for SDE, Peru, November 2014

Root Cause Analysis (RCA) Report for Rimac (Insurance Company for Arbitration) for a Failure of the SDF (Peru) Gas Turbine, August 2014

Confidential Expert Report Analysis of the GE Report Analyzing GE 9FA+e 298407 for Public Power Corporation, Greece, March 2014

Confidential Expert Report on Several 300 MW Steam Turbines (For Arbitration) Bharat Heavy Electricals Limited (BHEL), November 2013

Confidential Report-The Evaluation of The Siemens SGT 5-4000F -2012-OMAN

Report on a failure of GT 2 Solar Taurus 70 at Kent State University, October 2013

Report on a Valve Failure for Super Nova Compressor, October 2013

Confidential Report Abengoa-Puerto Rico, S.E. Combined Cycle Power Plant Project for PREPA September 2013, Trial to be held August 2015. Review of the EPC Contract work of Abengoa (A Spanish Company) on a Combined Cycle Power Plant, Puerto Rico, October 2012

Confidential Rebuttal Expert Report-Colon-Panama Combined Cycle Power Plant Project for Generadora del Atlantico S. A. Report for Arbitration held in September-October 2013

Report for Dresser–Rand on their 60 MW Steam Turbine, installed at Georgia-Pacific in Baton Rouge LA. The report deals with the Trip and Throttle (T&T) Valves and other damages to the rotor due to steam impurities, March 2013 and trial April 21<sup>st</sup> 2015

Confidential Rebuttal Report General Electric Heavy Duty Gas Turbine Nomenclature and Characteristics GE Frame 5 Gas Turbine, Garisan, Malaysia, April 2012

Confidential Report Analysis of Combined Cycle Problems for the Barka 3 and Sohar 2 Plants, Oman, December 2012

Confidential Expert Report on pump house fire at Grey Ranch gas processing facility, Fort Stockton, TX February 2012

Confidential Expert Report Failure Analysis of the SGT A+ Gas Turbine for SDF Energia SAC, December 2012

Confidential Expert Report Failure Analysis of a Solar Titan T-130 failure for Barrick Gold at the Hides Power Station in Southern Highlands in Porgera, Enga Papua New Guinea

Confidential Expert Report on the Valerus/Regency Eastside Compression Station Thermal Event for Regency Gas, August 2010

Confidential Expert Report Failure Analysis on Ammonia Refrigeration Compressor (C-5) for Hoerbiger Services, Inc., November 2011

Confidential Expert Report reviewing the entire pipeline pumping stations for the Trans Alaska Pipeline System, representing the state of Alaska

Confidential Expert Report Analysis of Damage to Gas Turbine Components in Hermiston, OR for Elrod PLLC and Pacifica, January 2012

Confidential Expert Report on Sweeny Cogeneration on behalf of BC Johnson and Associates LLC, Sweeny, TX, October 2010

Confidential Expert Report on BJ Services Fire for Certain Underwriters at Lloyd's and Certain London Market Insurance Companies

Confidential Expert Report on an Intellectual Property Dispute on Steam Turbine design infringement on behalf of Dresser-Rand Company Ltd.

Confidential Expert Report on overspeed conditions resulting in blade damage in Thailand on behalf of Dresser Rand

Confidential Expert Report regarding damage to a Siemens' Steam turbine in a Cogeneration Combined Cycle Power Plant in the U.K. on behalf of Representing GDF SUEZ/ Teeside Power Holdings



Confidential Expert Report Failure Analysis of the G.E. Steam Turbine at the Delta Power System's Cogeneration Facility Ludington, MI, May 2009

Confidential Expert Report Analysis Failure by Northern Power Systems, Inc. to Design, Engineer, Build, Install, and Commission a Three Hundred and Eighty-Five KW Stirling Engine Distributed Energy Power Plant for The Aarhuskarlshamn USA. Inc. Facility, March 2009

Confidential Expert Report On Combined Cycle Power Plant Supplemented by Packaged Power Boilers at Puerto Plata Dominican Republic, August 2008

Confidential Expert Report Outages Of The Leningradsky Metallichesky Zavod Steam Turbine Located At The Balti Electric Plant Narva Estonia, November 2007

Confidential Expert Report AES Red Oak, Analysis of Combined Cycle Power Plant, November 2006

Confidential Expert Report Preliminary Analysis ONEOK Bushton Plant, March 2006

Confidential Expert Report AES Wolf Hollow, Mitsubishi 501G Turbine, June 2005

Confidential Expert Report CFE Mexico Report GT 24 Combined Cycle Power Plant, June 2005

Confidential Expert Report Failure Analysis of Hangar Tail Door Speedway Building Systems, February 2005

Confidential Expert Report Peace Helicopter Turbomeca Arriel 1B Helicopter Engine, November 2004

Confidential Continental Airlines Fleet Emission Reports, June 2004

Confidential Expert Report, Aero-derivative Gas Turbine Plant Failure Due to Improper Overhaul, March 2004

Reliability, Availability, and Maintainability Program for Advanced Gas Turbines in Combined Cycle Applications, EPRI and US. DOE., December 2003

Confidential Expert Report, Gas Turbine Frame 7B Plant Overhaul and Installation, Problems, February 2003

Continental Airlines Fleet Emission Reports, December 2002

Confidential Expert Report and Mediation Report, Gas Turbine Plant Overhaul and Installation, Arbitration, September 2002

Confidential Expert Report, Aero-derivative Gas Turbine Plant Failure Due to Fuel and Water Injection Problems, August 2002

Reliability, Availability, and Maintainability Program for Advanced Gas Turbines In Combined Cycle Applications, US. DOE., May 2002



Confidential Expert Report, Frame Type Gas Turbine Plant Failure Due to Blade Failure Problems and Financial Analysis, April 2002

Confidential Expert Report, Condition Monitoring Systems, February 2002

Continental Airlines Fleet Noise Reports, December 2001

Continental Airlines Fleet Emission Reports, November 2001

Gas Turbine Fuel Analysis, A report for EPRI, August 2001

Performance Analysis of GT 24 for Hai- Fu Power Plant, August 2001

Upgrade of GT 24 for Hia –Fu Power Plant, May 2001

Confidential Report for Chrysler- Daimler and TACOM on the Diesel and Gas Turbine Options for the Army Tank, December 2000

Combined Cycle Power Plant based on the ALSTOM GT-24 for Ever Power Corporation in Taiwan Plant, November 2000

Confidential Report to the Director Environmental Affairs, on the Environmental Impact of the Continental Fleet on Emissions and Noise at their Hubs and at various worldwide locations, August 2000

Assessment of Micro-Turbines for the Malaysian Power System, Tenaga Nasional (Malaysian Power Company), May 2000

Techno-Economic Study on Re-Optimization of the Combined Cycle Plant at Connaught Bridge Power Station for Tenaga Nasional (Malaysian Power Company), April 2000

Reutilization Study of Distillate Tanks and Propose Option for Optimization of Existing Open Cycle Gas Turbines at Serdang Power Station for Tenaga Nasional (Malaysian Power Company), January 2000

Engine Noise Parameters for Aircrafts, July 1999, Continental Airlines, Houston, TX

Engine Emissions for the Continental Airlines Fleet, July 1999, Continental Airlines, Houston, TX

Combined Cycle Power Plant Performance Analysis, February 1999, China Light and Power, Hong Kong, China

Operational Report on the Solar -Sulzer Gas Turbine and Axial Flow Compressor Train, January 1999, Enterprise Products Corporation, Houston TX

Analysis of Solar Turbine Failures for Corrosion Engineering UK, and Det Norske Veritas, Norway, November 1998

Combined Cycle Power Plant Performance Analysis, August 1998, PowerGen, Connah's Quay, Wales, U.K.

Failure of Siemens Combined Cycle Power Plant at Kansa Power, Zurich Insurance, February 1998

Testing of Solar Mars and Sulzer Compressor Train for Enterprise Products Company MTBE Plant, January 1998

Evaluation of Power Plant Fuel Systems for Heavy Fuels Black and Veatch, and Blackwell and Sanders, December 1997

Report on Failure of Siemens V63.4 Gas Turbine with low NO<sub>x</sub> Combustors, CRSS\_Sirine, and Burns and Roe, September 1997

Combined Cycle Power Plant for Ittehad Chemicals, Pakistan, November 1997

Evaluation of Combined Cycle Power Plant for Public Power Greece, September 1996

Heavy fuels for Gas Turbines for SCECO Saudi Arabia, November 1995

Condition Monitoring System for a Combined Cycle Power Plant GE Frame 7A for EPRI and Fluor Daniel, June 1995

Condition Monitoring System for a Windbox Steam Power Plant for EPON and KEMA, December 1994

Condition Monitoring Systems for Low NO<sub>x</sub> Turbines for PEPCO, EPRI and Fluor Daniel, March 1993

Report on Phase 1 Investigation on Failure of WFEC Unit "C" Dr-61 Gas Turbine, Fetterly and Gordon, April 1992

Inspection, Repair and Installation of Power Turbine for Gas Turbine Unit "A", Wichita Falls Energy Company, February 1992

Inspection, Repair and Installation and Startup of Gas Turbine Unit "A", Vol. I, Wichita Falls Energy Company, September 1991

Installation and Startup Sequence of Events for the Gas Turbine Unit "C" for WFEC, Wichita Falls Energy Company, July 1991

Investigation into Blade Failures on Sidor Coppus Murray Steam Turbines, Nos. 273-JTI/JT2 (Hyl 11 Plant), C.V.G. Sidor, December 1991

A Review of Maintenance Practices and Strategy at InterAlumina, CVG InterAlumina Maintenance Group, July 1990

Preliminary Analysis on Blade Failure of BBC Gas Turbine (Type 11B) Unit 10 at Planta Urdaneta, Enelven, March 1990

Failure Analysis and Evaluation of K WV Unit I Gas Turbine, Kot Addu Plant, Water and Power Development Authority (WAPDA), September 30, 1989

Product Quality Review and Witness Test on DJ300G Gas Turbine Generator Set, Northland Power, Toronto, Ontario, September 29, 1989

Critical Speeds Analysis and Dry Diaphragm Coupling Selection for a 4840 HP Turbomachinery Train, Sun Oil Refineries, Tulsa, OK, July 18, 1989

Vibration Survey Report on Beloit Compressors 1 & 2, Occidental Chemical, Tacoma, WA, May 1989

Design Audit of Plant Re-evaluation of Steam Injection System, Wichita Falls Energy Investments, Wichita Falls, TX, September 1988

Report on East CW352 Startup, Petro-Canada Resources, Empress Gas Plant, Burstall, Saskatchewan, August 1988

Site Investigation of Vibration Problems K930, K4201, K4015A, Qatar General Petroleum Company, Doha, Qatar, August 1988

Performance Tests Mogran Creek Unit GT-2, Texas Utilities Electric Company, June 1988

Audit of Wichita Falls Energy Company, Wichita Falls Energy Investment Company, Wichita Falls, TX, March 1988

Performance Tests Monahans SES Unit GT101, Texas Utilities Electric Company, February 1988

Engineering Audit Report Cogeneration Facilities, Anschutz Ranch East and Wassan Cogeneration, Amoco Production Company, February 1988

Steam Turbine Failure Investigation, Inland Container Corporation, Rome, GA, January 1988

Engineering Report No. 34080 on the Failure of Two Impellers made by Atlas Copco COMPTEC, M.W. Kellog, Houston, TX, August 1987

An Overview of Condition Monitoring Systems with Emphasis on Brae "B" Platform, Marathon Oil Company

Startup Vibration Analysis and Documentation Train No. 8101, Tenneco Refiner, Chalmette, LA, June 1985

Control System Recommendations for L.G.T. Plant, Rohm and Haas TX, January 1984

Meneven Maintenance Manual, S.A. Meneven, Caracas, Venezuela, November 1983

Analysis and Re-Design of Clark 1M6 Compressor, I.W. Hickham Industries, July 1983

The External Combustion Steam Injected Gas Turbine, U.S. Department of Energy, July 1982

A Description and Evaluation of Alternate Power Generating Shortages for CADAFE in the Year 2000, Caracas, Venezuela, May 1982

Vibration Analysis of Turbocompressor Trains #1.2, 3.4, Michigan Wisconsin Pipeline, Patterson, LA, March 1982

Re-build and Mechanical Performance Test, Hooker Chemical Company, July 1981

Re-design of an Expander Train, Dow Chemical, July 1981

Report to Rolls Royce on compressor Selection, April 1981

Field Test and Evaluation of Axial Flow compressor #3 Acid Plant, Kaiser Aluminum Corporation, Savannah, GA, October 1980

Combined Cycle Power Generation Systems, Enlven Corporation, Venezuela, June 1980

Test of an External Combustion Gas Turbine with Steam Injection, Report to the Department of Energy, 1979

Development of Incipient Surge Detection Device. A lecture sponsored by the Gas Turbine Laboratories, Texas A&M University, June 1978

Development of Incipient Surge Detection Devices, Consortium Report, June 1978

Dynamic Simulation of High Speed Compressor Train, Report to Monsanto Corporation, August 1977

Multiple Fuels for Gas Turbines, University of Caracas, Venezuela, April 1976

Study and Research in the U.S.A., Victoria Jubilee Technical Institute, Bombay, India, January 1976

Flow Phenomenon in Centrifugal Compressors (Vol. I-Surge Prediction and Monitoring and Vol. II- Blade Loading of a Centrifugal Impeller) Report for limited circulation to sponsoring Corporations, Texas A&M University, January 1976

Research of TurboMachinery in the U.S.A., Winter School for Gas Turbine Engineering, Indian Institute of Technology, Madras, India, December 1975

Testing and Monitoring Compressor Trains, Petromin Corporation, Jeddah, Saudi Arabia, November 1975

Design Considerations in Axial Flow Compressors, Mitsui Corporation, Tokyo, Japan, September 1975

The Role of the Spectrum Analyzer in a Total Analysis System for High-Speed Rotating

Machinery, Engineering Foundation Conference, New England College, Hoencher, NH, July 1975

Vibration Research in TurboMachinery, Senior Orbit Engineer's Club, Lake Tahoe, NV, June 1975

Energy Research in the U.S.A. and U.S.S.R. in the Foreseeable Future, National Society of Professional Engineers, Baytown, TX, February 1975

Future Trends in Gas Turbine Research, Electric power Research Institute Workshop, Washington, D.C., February 1975

Research and Education in the U.S.S.R., Society of Automotive Engineers, Texas A&M, University Student Chapter, College Station, TX, February 1975

Performance and Aerodynamics of Centrifugal Compressors, Machinery Reliability School for Union Carbide Employees, New Orleans, LA

Aerodynamics and Axial and Radial Flow Compressors, Indian Institute Technology, Bombay, India, January 1974

Graduate Education on the United States, Indian Institute of Technology, Bombay, India, January 1974

Recent Developments in the Area of Aerodynamic Blade Loadings in Centrifugal and Axial Flow Compressors, University of Texas, Austin, TX, September 1973

Air Pollution Control Manual Report for National Cottonseed Association, Texas A&M University, College Station, TX, July 1973

Cottonseed Air Pollution, National Oil Mill Symposium sponsored by National Cottonseed Association, April 1973

Air Pollution and the Automobile, Society of Automotive Engineers, San Antonio, TX, March 1973

Air Pollution Control of the Laredo Customs Stations, REPORT for Government Services Administration, Texas A&M University, September 1972

New Developments in Automotive Engine to Curb Pollution sponsored by Workshop on Air Pollution Effects on Service and the Environmental Protection Agency, June 1972

Air Pollution Control, American Society of Meteorologists, Texas A&M University Chapter, January 1972

Aerodynamics of TurboMachinery, University of Hawaii, September 1971

Supersonic Flow in Axial Compressors, Ishikawajima-Harima Heavy Industries Company, Ltd., Tokyo, Japan, October 1971

Development and Control of Drag, Texas A&M University, September 1970

Vaporized Fuel Oil, Report to Allied Chemical, February 1977

Report on Test Conducted at Esso Pakistan Fertilizer Plant, Daharki, Pakistan, January 1977

Viscous Drag Reduction, University of Arizona, February 1969

### **LECTURES AND SHORT COURSES**

Lecture Gas Turbine Failure Mediation Presentation – Madrid, Spain April 6<sup>th</sup> 2016

Lecture Presentation on Combined Cycle Steam Turbine Output by accounting for Pressure Correction Factors ASME PTC6, January 2015

Optimization of Combined Cycle Power Plants using Advanced Technology Gas Turbines. Sole Instructor, London, England, November 19-23, 2012

Advanced Technology Gas Turbine and Planned Optimization of Combined Cycle Power Plants Short Course, Sole Instructor, Galveston, TX, March 9-13, 2009

Advanced Gas Turbine Technology and Planned Optimization of Combined Cycle Power Plants Short Course, Sole Instructor, London, England, November 9-13, 2009

Advanced Gas Turbine and Centrifugal Compressor Course -Short Course, Sole Instructor, London, England, May 19-23, 2008

Gas Turbine Technology and Planned Optimization of Combined Cycle Power Plants Short Course, Sole Instructor, Houston, TX, April 29-May 2, 2008

Gas Turbine Technology and Planned Optimization of Combined Cycle Power Plant Short Course, Sole Instructor, London, England, January 30-February 2, 2007

The Combined Cycle Power Plants Operations, Maintenance and Planned Optimization Short Course, Sole Instructor, Houston, TX, January 16-19, 2007

Technology of Advanced Gas Turbines and Centrifugal Compressors for Enterprise Products Operating, LP. Personnel only– Short Course, Sole Instructor, Mont Belvieu, TX, July 17-20, 2006

Technology of Advanced Gas Turbines, Short Course, Sole Instructor, for Impartir Conferencia “Operación Y Mantenimiento De Turbinas De Gas” en el IX Congreso y Exposición Latinoamericana De Turbomaquinaria”, Vera Cruz, Mexico, June 21-22, 2006

Technology of Advanced Gas Turbines and Centrifugal Compressors, Short Course, Sole Instructor, Houston, TX, June 13-16, 2006

Technology of Advanced Gas Turbine, Short Course for PEMEX personnel only, Sole Instructor, Quintero, Mexico, June 1-2, 2006

Combined Cycle and Cogeneration Power -Short Course, Sole Instructor, London, England, May 15-17, 2006

Technology of Advanced Gas Turbines – Short Course, Sole Instructor, Barcelona Spain, May 5-6, 2006

Combined Cycle Power -Short Course, Sole Instructor, Sponsored by Texas A&M University sponsored course at the TurboMachinery Symposium, Houston TX, December 12, 2005

Technology of Advanced Gas Turbines and Centrifugal Compressors – Short Course, Sole Instructor, Las Vegas, NV, December 4-5, 2005

Combined Cycle Power -Short Course, Sole Instructor, Sponsored by Texas A&M University sponsored course at the TurboMachinery Symposium, Houston, TX, September 20, 2004

The Outlook for Engineering – Dinner Speech for the Scholarship Award Dinner Aerospace and Mechanical Engineering Department, University of Oklahoma, September 8, 2004

Technology of Advanced Gas Turbines and Centrifugal Compressors, Short Course, Sole Instructor, Houston, TX, April 27-30, 2004

Technology of Advanced Gas Turbine, Short Course for PEMEX personnel only, Sole Instructor, Monterey, Mexico, March 23-March 24, 2004

Technology of Advanced Gas Turbine, Short Course for Legal personnel only, Sole Instructor, Birmingham, AL, January 20, 2004

Combined Cycle Power -Short Course, Sole Instructor, Sponsored by PowerGen, Las Vegas, NV, December 7 – December 8, 2003

Technology of Advanced Gas Turbine, Short Course, Sole Instructor, Sponsored by Texas A&M University sponsored course at the TurboMachinery Symposium, Houston TX, September 8, 2003

Technology of Advanced Gas Turbine – Short Course for PEMEX personnel only, Sole Instructor, Vera Cruz, Mexico, June 24-June 25, 2003

Advanced Gas Turbine Technology-Short Course, Sole Instructor, Sponsored by PowerGen, Orlando FL, December 8 – December 9, 2002

Gas Turbine - Short Course—One Day, Sole Instructor, Texas A&M University sponsored course at the TurboMachinery Symposium, Houston, TX, September 9, 2002

Technology of Advanced Gas Turbine, Short Course, Sole Instructor, Amsterdam, The Netherlands, May 31 - June 1, 2002

Advance Gas Turbine Technology, Short Course, Sole Instructor, Galveston, TX, February 28 - March 1, 2002

Advanced Gas Turbine Technology, Short Course, Sole Instructor, Sponsored by PowerGen, Las Vegas, NV, December 9 - 10, 2001

Combined Cycle Power Plants, Short Course, Sole Instructor, London U.K., October 22 - 26, 2001

Gas Turbine - Short Course, One Day, Sole Instructor, Texas A&M University sponsored course at the TurboMachinery Symposium September 2001, Houston, TX

The Basics Of Gas Turbine Technology, Short Course, Sole Instructor, New Orleans LA, Sponsored by ASME- IGTI June 1 – June 2, 2001

“Condition Monitoring for Advanced Gas Turbines” Invited Lecturer, Department of Energy Sponsored Conference on Advancing The Gas Turbine Power Industry, December 4 - 6, 2000, Washington, D.C.

“Advanced Control System Technology”, Invited Lecturer by the Department of Energy at their sponsored workshop, “The Aerospace/Power Industry Control System Technology Transfer”, November 16, 2000, Orlando, FL

“New Techniques in Condition Monitoring” Department of Energy Sponsored Workshop, November 13, 2000, Orlando, FL

TurboMachinery for the Energy Industry, Sole Instructor for a Two Day Short Course, November 2000, Sponsored by PowerGen, Orlando, FL

TurboMachinery for the Energy Industry, Sole Instructor for the Five Day Short Course, October-November 2000, Sponsored by the Institute of Diesel and Gas Turbine Engineers, London, U. K.

International Power and Petrochem Consortium, Chairman and Invited Lecturer, October 2000 at DERA, Farnborough, U.K.

Gas Turbine Short Course, One Day, Sole Instructor, Texas A&M University sponsored course at the TurboMachinery Symposium, September 2000, Houston, TX

“Condition Monitoring of Large Combined Cycle Power Plants” Invited Lecturer, Department of Energy, Power Producers and Petrochemical Users of Advanced Gas Turbines Workshop, June 6-7, 2000, Washington D.C.

TurboMachinery for the Energy Industry, Sole Instructor for the Five Day Short Course, May 2000, Sponsored by the Institute of Diesel and Gas Turbine Engineers, London U. K.

TurboMachinery for the New Millennium, Chairman and Invited Lecturer, May 2000 at DERA, Farnborough, U.K.



TurboMachinery for the Energy Industry, Sole Instructor for the Five Day Short Course, December 1999-  
Singapore

Combined Cycle Power Plants, Sole Instructor for the Five Day, Short Course, September 1999, London,  
U.K.

TurboMachinery for the New Millennium, Key Note Speaker, TurboMachinery Symposium September  
1999

New Developments in Gas Turbines, Invited Lecturer at the Naval Post Graduate School Monterey, CA,  
July 1999

Optimizing Condition Monitoring, and Modeling of Plant Aerothermodynamics for Improved Plant  
Availability, Maintainability and Efficiency Short Course, March 1999

Combined Cycle Power Plant Operation, Berlin, Germany, December 1996

Gas Turbines in Utility Service, Berlin, Germany, January 1996

Gas Turbines and Centrifugal Compressors Operation and Maintenance, Warrick, U.K., May 1996

Combined Cycle Power Plant and High Technology Gas Turbines, For National Power, November 1995,  
Swindon, U.K.

Combined Cycle Power Plants, Arnhem, The Netherlands, September 1995

Gas Turbines and Centrifugal Compressor Technology, Dubai, April 1995

Gas Turbines for Utilities, Arnhem, The Netherlands, September 1995

Gas Turbines and Compressors for the North Sea, Oslo, Norway, Short Course presented annually from  
1991-1994

Gas Turbine and Centrifugal Compressor, Margarita Island, Venezuela, April 15-18, 1991

Gas Turbines and Centrifugal Compressors, U. K., presented annually 1990-1996

Operation and Maintenance of Gas Turbines, Cranfield School of Mechanical Engineering, January 8-12,  
1990, Cranfield, England

Design Operation and Maintenance of TurboMachinery, Aberdeen, Scotland, May 1988

Design, Operation and Maintenance of TurboMachinery Short Course, Dubai, U.A.E., February 1988

Gas Turbine-Centrifugal Compressor Short Course, Norway, November 1987

General TurboMachinery Course, London, England, June 1987

New Developments in On-line Diagnostics for TurboMachinery, Lecture at Cranfield University, Cranfield, England, 1987

Short Course on TurboMachinery, Anchorage, AK, March 1987

Operation and Maintenance of Gas Turbines and Centrifugal Compressors, Boyce Engineering/Nico International, DUBAI, U.A.E., January 1987

Gas Turbine and Centrifugal Compressor Short Course, Houston, TX, November 1986

Gas Turbine and Centrifugal Compressors, Houston, TX, May 1986

Gas Turbine and Centrifugal Compressor Course, London, England, May 1986

Rotating Machinery Short Course, Short Course, Anchorage, AK, February 1986

New Developments in TurboMachinery Design, Lecture at University of Houston, 1986

Gas Turbine and Centrifugal Compressor Short Course, Houston, TX, November 1985

Short Course on Centrifugal Compressors, London, England, October 1985

Gas Turbine and Centrifugal Compressor Short Course, Houston, TX, October 1984

General TurboMachinery Short Course, Houston, TX, April 1984

Maintenance and Reliability Improvement Short Course, Houston, TX, April 1984

Gas Turbine Short Course, S.A. Meneven, Caracas, Venezuela, October 1981

TurboMachinery Short Course, Boyce Engineering International, Inc. facilities, Houston, TX, September 1981

Maintenance of Rotating Machinery Short Course. Boyce Engineering International, Inc. facilities, Houston, TX, July 1981

Short Course on Gas Turbines and Centrifugal Compressors, Phillips 66, Stavanger, Norway, March 1981

Gas Turbines Short Course, S.A. Meneven, Caracas, Venezuela, October 1980

Surge Characteristics in Centrifugal Compressors sponsored by ASME Houston Chapter, September 1978

Spectrum Analysis for Surge Control. A Lecture sponsored by the Engineering Foundation at New England College, Hoenecker, NH, July 1978

Spectrum Analysis, A Look in TurboMachinery Maintenance, Invited Lecturer, Nicolet Scientific, June 1977

Cavitation Problems and Pump Sizing, Invited Lecturer at Pump Symposium sponsored by Chemical Engineering, January 1977.