

William E. Forsthoffer

EXPERIENCE:

More than forty -five years accumulated experience in the field of rotating equipment (custom designed compressors, pumps, gears, turbine and auxiliary systems).

From 1963 to 1974 (1963-1968 summer training and co-op period) was employed by a major rotating equipment vendor in the areas of machinery applications, design and testing. Significantly contributed to the implementation of the company's new design compressor line and became very proficient in auxiliary system design. Held the position of "Manager of Project Engineering-Process Compressors" for four years prior to leaving the company in 1974.

From 1974 to 1990, I was employed by a major oil company as a rotating equipment specialist responsible for; supervision of engineering contractors for rotating equipment used on large projects (in excess of \$100MM), field commissioning and trouble-shooting and formalized classroom training courses related to rotating equipment:

February 1, 1990 - Present: President, Forsthoffer Associates, Inc. - Rotating Machinery Consultants specializing in training, trouble-shooting and application of rotating machinery on a world-wide basis.

EMPLOYMENT HISTORY:

Forsthoffer Associates Inc. Washington Crossing PA

February 1, 1990 – Present:

President - Responsible for entire Business Function. Performed Consulting Services in Rotating Equipment for all major Up Stream and Downstream Chemical, Oil and Gas Clients Globally. Consulting Services consisted of:

- Project Work
- Troubleshooting
- Training

Mobil Research and Development Corp. Princeton, New Jersey

January 1988 - January 1990: Training and trouble-shooting specialist

Duties: Responsible for formalized rotating equipment training and prompt resolution of all major (downtime related) rotating equipment problems. Major work efforts to date have been:

- **All of 1988: Personally developed and taught rotating equipment training courses to domestic and international company affiliates. All courses were extremely well received.**
- 1989 Personally developed a proposal for a company wide technical service group that has been selected for implementation by the company.
- 1988-1989 Resolved several long standing rotating equipment problems. To name a few.
 - Low density polyethylene recycle compressor mechanical problems (increased monthly revenue by 30%)
 - Reformer compressor mechanical problems (saved loss of one week unit revenue – \$7 MM)

April 1977 - December 1987: Engineering Associate Rotating Equipment

Duties: Responsible for proper selection and vendor engineering follow-up for all rotating machinery purchased for major capital petroleum and petrochemical projects greater than \$100,000,000. Above duties were accomplished by working with contractors equipment and utility engineers assigned to the project. Number of contract engineers assigned varied from six to ten. Projects assigned during this time were:

- Yanbu Petrochem Complex
Contractor - Bechtel
Approximate Value: \$2,400,000,000
- Coryton Residual Upgrading
Contractor - M.W. Kellogg, Wembly UK
Approximate Value: \$300,000,000
- Beaumont Low Density Polyethylene Facility
Contractors - Stearns Roger, Denver, Colo.
Approximate Value: \$150,000,000

December 1974-April 1977: Senior Engineer, Rotating Equipment

Duties: Responsible for correct application of Centrifugal and Reciprocating Compressors, Pumps, Gas Turbines, Steam Turbine Drivers and Turbo Generators for refining and petrochemical projects.

DeLaval, Inc.
Trenton, New Jersey

January 1971-December 1974: Project Manager, Centrifugal Process Compressors

Duties: Responsible for all phases of engineering and drafting of all centrifugal process compressors from customer coordinating meeting to successful field start-up. Reported directly to the Manager of Compressor Engineering. All projects involved custom design of centrifugal compressors and all associated systems. A typical project required the supervision of five to ten design engineers and draftsmen. With the aid of three to five project engineers reporting directly to the Project Manager, up to forty separate compressor projects were handled simultaneously. The average dollar value of one project was \$1,000,000. Projects handled included:

- **M.W. Kellogg 1000 T/D and 1200 T/D NH₃ plant compression equipment, various process compressors, air separation compressors and ethylene compressors.**

May 1968-January 1971: Centrifugal Compressor Engineering

Duties: Reported to a project engineer and performed calculations for Aerodynamic Design, Mechanical Design and Auxiliary Systems and Controls. In addition, sustained customer and vendor exposure and made business trips for the purpose of post-order meeting and field trouble-shooting.

June 1967-September 1967: Turbine Engineer (Co-op period)

Duties: Performed thermodynamic calculations of steam flow, system heat balance calcs and selected valving for large steam turbines.

September 1966-December 1966: Test Floor (Co-op period)

Duties: Tested centrifugal pumps and compressors. Completely responsible for the test set-up, testing and preparing test reports for all single stage centrifugal pumps manufactured by DeLaval.

January 1966-May 1966: Test Floor (Co-op period)

Duties: Responsible for supervision of test set-up, actual test and calculation of test results for centrifugal compressors and steam turbines on all M.W. Kellogg, NH₃ plants.

Summer 1963, 1964, 1965: Employed under DeLaval's summer trainee program; worked in the Compressor Sales and Engineering Departments. Became familiar with engineering calculations and sales techniques.

EDUCATION:

COLLEGE: 1962-1965 Bellarmine College
Louisville, KY
Degree: B.A. Math
Grade point average. 2.0 out of 3.0

1965-1968 University of Detroit
Detroit, MI
Degree: B.S.M.E.
Grade point average. 3.1 out of 4.0

ACTIVITIES: Pi Tau Sigma - Vice President 1967-1968
Vice President of University of Detroit Student Council 1967-68
Member of Tau Beta Pi

PERSONAL:

Born: June 3, 1944
Marital Status: Married June 20, 1970
Four children
Travel History: Traveled extensively in Europe, Asia, Canada,
Middle East, Far East and United States.

Personal references furnished upon request.

MICHAEL S. FORSTHOFFER

SUMMARY:

Mechanical Engineer with 10+ years experience in Rotating Equipment (both on Design and End-User side), since freshman in College.

EDUCATION:

Rochester Institute of Technology - Rochester, NY

Bachelors of Science – Mechanical Engineering, May 2003

Dean's List Honors

3 blocks of cooperative education (each consisting of 6 months)

WORK EXPERIENCE:

Summary

- ◆ January 2009 – Present (Full Time) – Rotating Equipment Consultant with Forsthoffer Associates, Inc.
- ◆ 2005 -2008 – John Crane, Inc, Applications Engineer (9 months in 2005), Site Reliability Engineer (2006-2008), Hovensa Refinery, St. Croix, USVI
- ◆ 2004 – March to November – Dakota Gasification Plant, Beulah, ND, Reliability Contract Engineer
- ◆ June 2002 to November 2002 – Dresser-Rand, Olean, NY, Technical Support Engineer for the Aftermarket Parts Div.
- ◆ June 2000 to November 2000 – Fluid Systems Inc., Fairfield, NJ, Applications Engineer
- ◆ 1999 to present - U.S. & International Refining Experience with Forsthoffer Associates, Inc.

Detail

- ◆ **January, 2009 –Present – Full Time Rotating Equipment Consultant for Forsthoffer Associates, Inc.**
 - Conducted Site Specific Training, following are a few examples:
 - ADGAS Das Island – Compressors, Principles of Rotating Equipment, Component Condition Monitoring, Troubleshooting
 - YANPET (Exxon), Yanbu, Saudi Arabia – Pump Mechanical Seals (2 Sessions), Reciprocating Compressors and Gears
 - Hibernia (Exxon), St. Johns, Newfoundland – Auxiliary Systems

- P.T. BADAQ, Bontang, Indonesia – Auxiliary Systems
 - Husky Oil, Rainbow Lake, Alberta – Principles of Rotating Equipment (4 Sessions)
- Witnessed Compressor Performance and Mechanical Tests for projects in Indonesia and Pakistan
 - Conducted Site Audits for Centrifugal Compressors at a number of sites around the world (Canada, UAE, USA).
 - Heading a Project to Re-Rate an existing out of service Centrifugal Compressor to replace Lubricated Screw Compressors in a service containing H₂S.
 - Heading Project to purchase new Flash Gas Compressor to reinject and recover an extra \$750,000 per day revenue.
 - Conducted troubleshooting on various Pumps, Compressors, Steam Turbines, and Auxiliary Systems.
 - Presented a tutorial on Mechanical Seal Condition Monitoring at the 1st Annual Middle Eastern Turbomachinery Symposium (METS) hosted by Texas A&M.
- ◆ **2005-2008 – John Crane, Inc.**
- Applications Engineer (6 months) – Support Salesmen and perform Mechanical Seal Failure Analysis for Northeast Branch.
 - On-Site Reliability Engineer (3 years) – Hovensa Refinery, St. Croix, VI – Mechanical Seal Technical Support for Maintenance and Reliability. This included field troubleshooting of seals and aux. systems and application of new seals.
 - Much practical field knowledge was obtained during the 3 years on –site.
- ◆ **2004 – March to November – Dakota Gasification Plant Beulah, ND**
- Reliability Engineer (contract employee). Started a Plant-wide Performance Monitoring Program to determine the internal condition of Compressors (Centrifugal and Axial) and Steam Turbines while in operation. Tasks and accomplishments follow:
- Generated original performance curves based on test report data.
 - Identified key performance instrumentation that was believed to be faulty. Organized a plant-wide program to calibrate instruments and replace as necessary. Developed a plan to replace all local gauges with transmitters in order to facilitate real time monitoring of all equipment on-line via the DCS system.
 - Collected performance characteristics data (Head, Efficiency, and Horsepower) for all Compressors and Steam Turbines. Calculated and compared data to original performance curves in order to determine the current (“Baseline”) internal status of the equipment.
 - Set up performance monitoring software to calculate the performance of equipment while running. The Program compared trends to the original performance curves. Conducted training for reliability and process engineers to familiarize them with the program.

- Created spreadsheets to calculate compressor performance and keep track of the condition of the five major rotating equipment components (Rotor, Journal Bearings, Thrust Bearings, Seals, and Auxiliary Systems).
- Performed any other tasks presented by the reliability group to assist in maintaining reliable rotating equipment.

◆ **June 2002 to November 2002 – Dresser-Rand, Olean, NY**

Technical Support Engineer for the Aftermarket Parts Div. . Focused on the design and retrofit of Centrifugal Compressor and Gas Turbine components for existing equipment in the field. Tasks and accomplishments follow:

- Designed bushing seal for Mitsui Chemicals 2BF Compressor to incorporate new “Z-Ring Windback” inner seal ring. Purpose of design was to reduce sour oil leakage and reduce retention time in degassing tanks.
- Redesigned original three piece (welded) impeller to a 2-piece (milled disc and welded to cover) impeller for an air blower used by Texas Eastern. The design however, had to be changed to a non-conventional method due to unusual curvature of the blades. The new design worked successfully and has been in the field since March, 2003 with no reported problems.
- Acted as knowledgeable “sounding board” for design staff questions pertaining to operating conditions and specifications on machines and their parts in the field.

◆ **June 2000 to November 2000 – Fluid Systems Inc., Fairfield, NJ**

Applications Engineer. Fluid Systems, Inc., manufactures Lube/Seal Oil Systems for use in the industry on both compressors and turbines. Tasks and accomplishments follow:

- Quoted pumps, coolers, filters, valves and raw materials for systems. Selected components based on specifications and pricing.
- Performed valve-sizing calculations in order to pick the most efficient valves available for the desired processes.
- Calculated equipment heat load using heat transfer theory in order to size the correct cooler.

◆ **1999 to Present (As Needed)- U.S. & International Refining Experience(Forsthoffer Associates, Inc.). Performed on site testing and troubleshooting in numerous refineries & plants worldwide. Among them were:**

- Aramco; Rabigh, Saudi Arabia - Investigated a high journal bearing temperature on several pumps in the field and recommended a Lube System (based on heat load calculations I performed) to remove excessive heat load. These systems have been installed and the problem has been resolved.

- Citgo; Corpus Christi, Texas – Reviewed a Lube system problem that occurred during start-up and shut-down (transient conditions) of a compressor. During these times the whole system, including piping, would vibrate well beyond accepted limits. Recommended the removal of the current pneumatic actuated backpressure valve in the system and the installation of a direct acting valve. This resolved the vibration problems.
- Methanex; Kitimat, Canada – Conducted field performance tests on Centrifugal Compressors as an audit, and found the tested machines to be running within accepted performance values.

JIMMY E. TRICE

PROFESSIONAL EXPERIENCE:

Rotating equipment engineering in a wide variety of industrial facilities, including oil refining, LNG, natural gas processing, large power generation, off shore oil and gas processing. Extensive experience in the troubleshooting, analysis and root cause solution of machinery problems, overhaul, repair, and management of rotating equipment functions in maintenance, technical and consulting organizations. Supervision and management of engineering staff and business activities with major domestic and international clients.

Royal Dutch Shell
Senior Rotating Equipment Engineer
August 2006 – November 2012

Sakhalin Energy Investment Co. Ltd
Engineering & Maintenance
Yuzhno-Sakhalinsk, Russia

Shell secondee to SEIC supporting Operations, Maintenance, Projects for onshore gas, oil and power generation facilities. Shell Technical Authority 2, responsible for maintenance quality assurance, operations and maintenance support, root cause analysis, problem solution development and support of rotating equipment discipline corporate initiatives.

Sakhalin Energy Investment Co. Ltd
Maintenance & Integrity - North
Onshore Processing Facility
Nogliki, Russia
July 2008 – July 2011

Shell secondee to SEIC supporting commissioning of OPF power generation, gas compression, crude oil pumping equipment. Responsible for rotating equipment operational acceptance, maintenance quality assurance, maintenance overhaul planning, operations and maintenance support, root cause analysis and preventive / condition based maintenance program development.

Shell Global Solutions
Kuala Lumpur, Malaysia
August 2006 – Present
Senior Rotating Equipment Engineer
Market Sector Lead – LNG & GTX
August 2006 – July 2008

Provide rotating equipment support to Shell projects, Shell operating facilities and third party operating plants throughout Asia Pacific region.

RUMBLE CREEK TECHNOLOGY – Self Employed
Condon, Montana
January 1998 – August 2006

August 2000 – August 2006 - Contract to Abu Dhabi Liquefied Natural Gas as Senior Rotating Machinery Engineer, Maintenance Dept. Responsible for maintenance, root cause analysis, shutdown planning, shutdown execution, vendor coordination, contractor supervision, and repair definition of LNG plant major process and utilities machinery. Conducted major machinery longevity and reliability improvement program from proposal through implementation, delivered on schedule and under budget. Developed and managed comprehensive plant condition monitoring function including vibration, performance, and mechanical assessment of all plant rotating equipment.

January 1998 – August 2006 – Associate of Forsthoffer Associates Inc providing rotating equipment troubleshooting, witness testing and training for variety of domestic and international clients.

VIRGINIA INDONESIA COMPANY - P.T. Badak LNG Plant
Bontang, East Kalimantan, Indonesia May 1990 - July 1996
Rotating Equipment Specialist

Rotating Equipment Specialist, Technical Department, providing technical support to plant Maintenance and Operations at the P.T. Badak NGL Plant in Bontang, East Kalimantan, Indonesia. Responsible for technical review of projects, analysis and solution of plant machinery problems, and major machinery repair specification. Administer rotating equipment engineering segment of corporate sponsored career development program. Primary plant equipment are steam turbines, centrifugal compressors, generators and pumps in refrigeration and power generation service.

M.W. KELLOGG - Plant Services Division
Houston, Texas July 1988 - May 1990
Rotating Equipment Specialist

Rotating equipment specialist contracted to Abu Dhabi National Oil Company. Responsible for analysis, recommendation and solution of repetitive machinery problems at two major refineries and one natural gas processing plant. Primary objective of the contract was to specify equipment, train staff, develop and operate computer based machinery condition monitoring and machinery reliability programs. At completion of ADNOC project reassigned to Houston headquarters to develop equipment reliability programs for plants worldwide.

BENTLY NEVADA CORPORATION - Machinery Diagnostic Services

Santa Ana, California January 1985 - June 1988
Manager - Western Region, U.S.A.

Manager of department providing rotating machinery diagnostic services throughout western region of domestic U.S.A.. Specific responsibilities included day to day supervision of engineers in three regional offices, technical review, training, capital budgeting and administration. Customer base included major oil and gas producers, refineries, power generation and rotating machinery OEMs.

Singapore, Republic of Singapore December 1983 - January 1985
Senior Field Engineer

Based in the Republic of Singapore to provide machinery diagnostic services to petrochemical and power generation clients throughout ASEAN region. Utilized sophisticated test instrumentation in the solution of rotating machinery problems in both onshore and offshore petrochemical installations. Serviced major contracts to provide field mechanical acceptance testing for the Petrochemical Complex of Singapore commissioning. Conducted formalized customer training courses in the theory and application of vibration analysis, machinery balancing, and troubleshooting.

CREOLE PRODUCTION SERVICES - Applied Services Department
Houston, Texas June 1980 - March 1983
Supervisor - Vibration Department

Gulf of Suez Petroleum Company, Ras Shukier, Egypt
Arabian American Oil Company, Udhailiyah, Saudi Arabia

Assigned to various contracts predominantly in the Middle East countries to develop, implement and train staff in rotating machinery vibration analysis programs. ARAMCO project involved large gas turbine, gas compression/injection and water injection equipment. GUPCO (Amoco) equipment were largely aeroderivative gas turbine driven gas compressors and generators throughout onshore and offshore oil processing facilities. Similar shorter duration projects were completed for Kuwait Oil Company and Exxon Production California.

BENTLY NEVADA CORPORATION - Mechanical Engineering Services
Houston, Texas June 1978 - February 1980
Field Engineer - Gulf Coast Region

Field engineer conducting vibration analysis, balancing, and mechanical troubleshooting of large rotating machinery in petrochemical and power generation service throughout domestic U.S.A..

**ARABIAN AMERICAN OIL COMPANY - Technical Services Department
Dhahran, Saudi Arabia July 1975 - September 1977
Engineer**

Staff engineering position based in Dhahran, Saudi Arabia involved in various aspects of rotating machinery projects, studies, specification, and troubleshooting.

EDUCATION:

Bachelor of Science in Mechanical Engineering
Administration -
University of Arizona, May 1975
complete 1988

Masters in Business
National University, 80%

Various industry courses and seminars in vibration analysis, failure and root cause analysis, performance of rotating machinery, rotor dynamics, RCM, ISO 9002, compressor surge control systems.

DENNIS A. CAMPBELL

SUMMARY:

Manager of Auxiliary Systems Engineering for a leading turbomachinery manufacturer. Professional career over three decades in positions ranging from Design Engineer, Project

Engineer, Project Engineering Group Leader, Manager of Cost Operations, to Manager of Auxiliary Systems Engineering. Eighteen years of participation as Task Force member on the API-614 (Lubrication, Shaft-Sealing, and Control-Oil systems and Auxiliaries for Petroleum, Chemical and Gas Industry Services) committee (3rd, 4th, and 5th Editions). Successfully completed training in Six Sigma methodology (Green Belt).

EXPERIENCE:

Siemens Demag Delaval Turbomachinery, Inc., Trenton, N.J. - 1969 to Present

A worldwide provider of steam turbines, gas turbines, and centrifugal compressors for the industrial market place. Primary clients include oil, natural gas pipeline, and chemical companies both domestic and international

Manager of Auxiliary Systems Engineering (6 engineers & 5 draftsmen) - 1993 to Present

- In-depth knowledge of centrifugal compressors, lube and seal oil systems, gas and steam sealing systems, and all components that comprise these systems. Developed standardized specifications and negotiated pricing for the auxiliary systems and components.
- Mentored and educated my direct reports as well as members of other departments on auxiliary system designs as well the philosophy behind the creation of the strategic agreements, and the completion of data sheets to obtain system scope and cost.
- Responsible for ensuring that all the auxiliary systems (oil, gas, steam and controls systems) engineered are in compliance with industry and company standards as well as customer specifications; assigning jobs, monitoring schedules and budgets for orders, and performing annual reviews of personnel.
- Trouble shoot field system problems as well as advise up-grades/revamps to older systems (our own or others OEM's).
- Developed departmental budgets, staffing levels, project task hour and system development forecasts in conjunction with senior staff.

Accomplishments:

- Initiated and led 10 development project teams for oil and gas seal systems for various market segments.
 - The design improvements yielded increased reliable and improved

ergonomics. Engineering and drafting document accuracy improved. Design innovations addressed customer preferences, newer technology, and reported field problems.

- Development of auxiliary system data sheet enabled more efficient coordination between internal departments and reduced budget overruns by 75%.
- Cost benefits included reduction in engineering and drafting hours (50%), lower material cost (15%), reduced overall cycle time (40%). Formation of a strategic agreement with a system sub-vendor yielded an average 25% reduction in expenditures. Virtual elimination of all major field problems and customer back-charges.
- Represented Siemens Demag Delaval on the API- 614 Task Force (4th & 5th Edition).
- Selected & participated as Siemens Demag Delaval's technical representative for the Heat Exchanger CoC Target Agreement (Siemens worldwide) to reduce costs and reduce the number of capable suppliers.

Manager of Cost Operations (4 Cost analysts and administrative assistant) - 1991 to 1993

- Responsible for overseeing all cost estimates for new equipment (Turbine, Compressors, Gears and their auxiliary equipment), spare parts, and revamps.
- Responsible for establishing and reporting on job budgets (EBIT tracking with monthly presentation to senior staff).

Accomplishments:

- Implemented new costing procedures that yielded a 20% improvement in the accuracy of estimates for the machinery and auxiliary systems.
- Eliminated non-essential tasks (15% time savings).

Group leader of Project Engineering (4 Project engineers and 3 assistants) - 1986 to 1991

- Responsible for managing staff and workflow of all orders within project engineering.
- Responsible for overseeing all auxiliary systems designs prior to production to ensure compliance to industry and in house specifications and standards.
- Liaison to customers and internal staff for all engineering aspects. Developed specifications for outside purchase equipments (large electric motor, steam turbines, gears, condensers, and all components associated with the main equipment train and their auxiliary systems).

Accomplishments:

- Completed the first generation of the Standard Lube & Seal Oil System. This was

the first time a series of 7 different sizes and 3 pressure levels could be utilized across the full line of centrifugal compressors.

- Represented Delaval on the API -614 Task Force (3rd Edition).

Senior Project Engineer/Project Engineer - 1973 to 1985

- Served as the customer's/Delaval's single point contact *for* all engineering. Developed specifications for outside purchase equipment (large electric motors, steam turbines, gears, condensers, and all components associated with the main equipment train and their auxiliary systems).
- Responsible for the overall design of the centrifugal compressor including the compressor casing, bearings, seals, materials selection, and rotor design.

Accomplishments:

- Development of the first electronically controlled seal oil drainer system. Worked with Magnetrol to develop a Tri- Level capacitance level switch to activate a pneumatically operated ball valve.
- Initiated the development of a Standard Oil System (7 different sizes with 3 pressure levels within each size).
- Presented a paper on "Lubrication Oil System Design" to the Rotating Machinery Repair User's Council in Houston, Texas.

Engineer - 1969 to 1972

- Designed various components within centrifugal compressors.
- Served on the development team that designed Delaval's line of fabricated centrifugal compressors (performed compressor stress analysis, bearing design, and rotor dynamics).

Accomplishments:

- Helped to develop Delaval's first standard hydraulic taper shaft ends and worked with various coupling manufactures to optimize torque transmission (shrink fit and coupling) and reduce coupling weight.

EDUCATION:

Bachelor of Science In Mechanical Engineering: Penn State University

References:

Available upon request

ROBERT (BOB) AIMONE

Robert J. (Bob) Aimone, Senior Engineering Consultant and Technology Leader of the Mobil Paulsboro Machinery Group, retired August 1, 1998 after more than 30 years of service with Mobil and 41 years in the machinery field.

Bob obtained a Bachelor of Science degree in Marine Engineering from the United States Merchant Marine Academy August 1957 and a Master of Science degree in Mechanical Engineering from Stevens Institute of Technology June 1964. Bob is a licensed Professional Engineer in the states of New Jersey and Virginia and is a member of the ASME. He represented Mobil on the American Petroleum Institute Sub-Committee for Mechanical Equipment and has continued on as an active member of that committee. Prior to Mobil, Bob's experience includes engineering positions in the U.S. Navy, Worthington Corporation, and The Lummus Company. Bob's position with Worthington was as a field engineer and pump designer. His engineering expertise and responsibility in Worthington included: single state overhung, multistage horizontal split case, and double suction horizontal split case pump designs and applications. At The Lummus Company he was a machinery project engineer responsible for the technical acceptability and operation of mechanical equipment installed in ethylene, urea, and refinery process plants.

His global Mobil machinery engineering experience included projects in Japan, New Zealand, Singapore, Europe, Saudi Arabia, Nigeria, South Africa, Venezuela and the United States. The major projects he was assigned to were: Joliet and Yanpet Refineries, Gas Re-injection projects in Maracabo, Nigeria, North Sea and Indonesia, Ethylene and Polyethylene projects in Texas and Yanpet. In these assignments, his responsibilities included: application, control and protection system design, installation and operation of all types of mechanical equipment. This equipment included: pumps, compressors, steam and gas turbines, extruders, reactor mixers, and other specialty equipment.

Bob was the Machinery Technology Leader for Mobil since May of 1986 and provided leadership and technical support to both the upstream and downstream organizations. In this position he assisted operating plants by providing technical service to solve operating and maintenance problems. He established training programs for all skill levels for Mobil's technical staff to update their technical knowledge in the machinery area.

Bob, as a member of Mobil's Technical Advisory Counsel (TAC), continuously advised the highest level of corporate management which relevant new technologies would provide operating advantages to Mobil over competing petrochemical companies. He lead the effort to develop an online machinery monitoring program within Mobil and helped developed other state-of-the-art technologies in the machinery area. Bob also provided technical leadership to Mobil's Business Resources Corporation in the corporate effort to form alliances with strategic equipment manufacturers. As a TAC

member, Bob provided leadership and guidance in the Mobil reorganization effort in 1995 restructuring the old engineering organization into the new organization structure as it exists today.

ROY J. SALISBURY

EXPERIENCE:

ExxonMobil, Paulsboro, Fairfax, Houston 1997 – 2012

- Retired as Sr. Engineering Associate, Machinery, ExxonMobil Development Company, Houston, Texas
- Lead specification development, rotating equipment selection, and plant integration of the rotating equipment for Qatargas 2, the largest LNG plant in the world, boosting capacity from 4.7 MMTA, to 7.8 MMTA. Assignment included FEED, EPC, site installation, commissioning, and final acceptance. Initial design was replicated in 5 subsequent plants.
- Worked as Machinery Lead for both Canadian and American Low Sulfur Mo Gas Projects providing guidance to refineries in the selection of rotating equipment for this North American Sulfur Reduction Initiative
- Provided site support for Yanpet 2 Polypropylene and Lubref 2 in Saudi Arabia, North Sumatra Offshore, Altona, Australia Cat Cracker and Beaumont O&A expansion projects.

Siemens Demag-Delaval Turbomachinery, Trenton, New Jersey 1991-1997

- Customer Service Manager. Supervised accounts \$5.2MM in annual sales, and staff of 39 employees. Provided oversight for repairs as well as warranty administration for division product lines.

Elliott- Ebara Turbomachinery, Jeannette, Pennsylvania , Houston, Texas 1976-1991

- Shop Operations Manager / Manager Project Management, Houston, Texas. Coordinated shop repairs yielding \$8.2 MM in annual revenues. Responsible for OSHA compliance of facility and work performed therein, as well as machine tool reliability and facility operations. Direct supervisor for 38 shop employees and shop supervisors.
- Field Service Manager, Houston Texas. Coordinated service accounts yielding \$1.4MM in annual revenues. Administered regional contracts and warranties. Supervised multinational staff in several countries. Provided 24- hour technical support for clients in Texas, Louisiana, Oklahoma, Kansas, Mexico, the Caribbean, South America, as well as the Houston Repair Facility.
- Senior Service Engineer, Jeannette Pennsylvania.

Provided hands-on engineering field support during installation, start-up, testing and operation of product lines which included axial, single stage centrifugal and multi-stage centrifugal compressors, process packaging, and lube and seal oil systems. Developed and delivered a lube and seal system tutorial course at the Texas A&M Turbomachinery Symposium.

EDUCATION:

- B.S. Mechanical Engineering with Aerospace Option, Univ. of Pittsburgh, Pittsburgh, Pennsylvania 1976
- Senatorial Scholarship/Air Force Academy Alternate
- Awarded Four Year United States Air Force ROTC Scholarship
 - Pilot Program / Officer Training at Plattsburg AFB, New York
 - Marksman / Honorable Discharge

SKILLS:

Advanced experience and knowledge on both capital projects and field troubleshooting. Most recent experience was on the largest LNG plant built to date, which incorporated numerous rotating equipment technology step outs.

Co-authored the following papers:

Design, Manufacture, and Test Campaign of the World's Largest LNG Refrigeration Compressor String:
LNG 15

Successful Start-up and Operation of GE Frame 9E Gas Turbine Refrigeration Strings
LNG 16

Troubleshooting Centrifugal Compressor Oil Seal Problems
Turbomachinery International

Lubrication and Seal Oil Systems
Texas A&M Turbomachinery Symposium

Oil System Design
H. Bloch, A Practical Guide to Compressor Technology

Authored and presented 5 day training courses on Trouble Shooting Oil Systems to 36 separate Companies.