Citizens' Exhibit NC 11

Resumes of
J. Kirk Brownlee, P.E. and
Richard C. Biel, P.E.
of Stress Engineering Services, Inc.

STRESS ENGINEERING SERVICES INC.

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J. KIRK BROWNLEE, P. E.

Specialized Professional Competence

Mr. Brownlee is a registered professional engineer in the State of Texas (#94383). He holds a Bachelor of Science degree in mechanical engineering from Texas A&M University and a Master of Science degree in metallurgical engineering from the Colorado School of Mines. For over 20 years he has developed and demonstrated specialized competencies in the areas of materials selection and evaluation, corrosion control, welding engineering, nondestructive testing, and failure analysis principally as related to facilities for oil and gas production, transportation, and refining.

Research Activities

As a graduate student at Texas A&M, Mr. Brownlee conducted research on superplastic forming of aluminum alloys. His research at the Colorado School of Mines dealt with the effects of aluminum and titanium on the microstructure and properties of microalloyed steel weld metals. As a summer intern at the Los Alamos National Laboratory, Mr. Brownlee carried out research on the electron beam weldability of 5000-series aluminum alloys.

Since joining industry in 1985, Mr. Brownlee has conducted or participated in several research projects dealing with the sulfide stress cracking behavior of low alloy steels in sour environments.

Employment History

Staff Consultant, SES, August 2003 - Present
Staff Research Engineer, Shell Global Solutions, April 2001-August 2003
Sr. Staff Engineer, ExxonMobil Production Co., January 2000-April 2001
Sr. Staff Engineer, Mobil E&P US, August 1995-January 2000
Consultant, Metallurgical Consultants, Inc., January 1986-August 1995
Staff Engineer, Brown & Root Marine, May 1985-January 1986
Graduate Research Assistant, Colorado School of Mines, August 1982-May 1985
Pipe Stress Engineer, Fish Engineering & Construction, May 1981-August 1982

Academic Background

M. S., Metallurgical Engineering, Colorado School of Mines, 5/85
B. S., Mechanical Engineering, Texas A&M University, 5/80

Professional Honors

Tau Beta Pi
Pi Tau Sigma

Professional Societies

Society of Petroleum Engineers (SPE)
National Association of Corrosion Engineers (NACE) #101943-00

Publications and Presentations

Brownlee, J. K., The Effects of Aluminum and Titanium on the Microstructure and Properties of Micro alloyed Steel Weld Metal, Master of Science Thesis T-3064, Colorado School of Mines, Golden CO, April 1985.

Brownlee, J. K., Matlock, D. K., Edwards, G. R., The Effects of Aluminum and Titanium on the Microstructure and Properties of Micro alloyed Steel Weld Metal, Proc. Int'l. Conf. On Trends in Welding Research, Gatlinburg, TN, May 18-22, 1986.

Brownlee, J. K., Matlock, D. K., Edwards, G. R., The Effects of Aluminum and Titanium on the Microstructure and Properties of Microalloyed Steel Weld Metal, Advances in Welding Science and Technology, ASM, 1987, pp. 245-250.

Bruno, T. V., Craig, B. D., Brownlee, J. K., The Role of Ni in the SCC of Low-Alloy Steels, Corrosion, Vol. 46, No. 2, February, 1990, pp. 142-146.

Andersen, O., Brownlee, J. K., Craig, B. D., et. al., Material Requirements for Offshore Pipelines/Flowlines, Paper #7, Proc. Int'l. Workshop on Advanced Materials for Marine Construction, February 4-7, 1997, New Orleans, LA, AB S, 1999, pp 461-489.

Dougherty, J., Hausler, R., Brownlee, J. K., Solving Iron Sulfide Problems in a Recirculating Inhibitor Oil System, Paper Presented at NACE International Corrosion 2000, March 26-31, 2000, Orlando, FL.

Brownlee, J.K., Flesner, K.O., Riggs, K.R., Miglin, B.P., Selection and Qualification of Materials for HPHT Wells, SPE Paper No. 97590, 2005 SPE Applied Tech. Workshop on High Pressure/High Temperature Sour Well Design, Houston, TX, 17-19 May, 2005.

Brownlee, J.K., Speed, C.F., Decision Making in Coating Selection, Coatings for Corrosion Protection: Offshore Oil & Gas Operation Facilities, Marine Pipeline & Ship Structures, April 14-16, 2004, Imperial Palace and Casino, Biloxi, MS.

Engineering Design and Analysis

- Performed calculations to determine wet CO_2 and wet CO_2/H_2S corrosion rates for three deepwater Gulf of Mexico pipelines.
- Specified materials of construction for three CRA clad sour gas submarine pipelines.
- Specified materials of construction for a compressor booster station in Uzbekistan.
- Conducted fitness for purpose tests on CRA materials for sour gas compressor impellers.
- Designed automated corrosion monitoring systems for a large sour gas processing plant and two submarine sour gas pipelines.

- Designed risk-based inspection programs for fixed equipment in sour service.
- Performed failure analyses on numerous oilfield components including pressure vessels, pipelines, well head equipment, drill pipe, casing, tubing, piping & valves, etc.
- Prepared welding and line pipe specifications for a major offshore project in the deepwater GoM
- Determined and alleviated the causes for cracking during high temperature forming of 3Al-2V Ti-alloy pressure vessel heads

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RICHARD C. BIEL, P.E.

Specialized Professional Competence

Mr. Biel's current work is focused on fitness for service evaluations of pressure vessels and piping components and systems. This international practice has served a variety of clients including fabricators, petroleum refineries, power and chemical plants and paper mills. Before joining SES in 1994, he was the manager of R&D for a fabricator of pressure vessels and specialty high temperature refinery equipment and associated valves. His design work has included ASME Code pressure vessels for Division 1, 2, and 3 compliance as well as general machine designs. In addition, Mr. Biel has over 14 years of industrial experience in the design of land well heads and gate valves, including designs for Arctic service and critical sour, corrosive service. As a consultant from 1980 to 1985, he had assignments with numerous clients involving well heads, gate valves, pressure vessels, oil tools, general machine design, and forensic engineering.

Mr. Biel currently serves as a member of the Special Working Group on High Pressure Vessels (SWG-HPV SC VIII). This ASME Code committee authors the Boiler and Pressure Vessel Code, Section VIII, Division 3, ***Alternate Rules for Construction of High Pressure Vessels***. He also serves on various other ASME Code committees.

Research Activities

Mr. Biel has tested prototype valves and well heads under extreme environmental conditions, including low temperature and high temperature and high pressure gas. He has qualified many well head components to meet API Specifications by classical calculations and physical tests.

He designed modifications to a flowing test facility where he physically life-cycle tested gate valves to 10,000 psi for hundreds of cycles to evaluate wear and performance.

Employment History

Senior Associate/Staff Consultant, Stress Engineering Services, Inc. 1998 - Present
Staff Consultant, Stress Engineering Services, Inc., 1994 - 1998
Manager, Research and Development, Enpro Systems, Inc., 1990 - 1994
Manager, Material Test Section, NASA White Sands Test Facility, Lockheed Engineering and Sciences Company, 1988 - 1990
Manager, Product Engineering (Wellheads), WKM, 1985 - 1987
President, Cornerstone Engineering, Inc., 1980 - 1985
Senior Design Engineer, National Supply Company, 1978 - 1980
Applications/Design Engineer, Gray Tool Company, 1975 - 1978
U.S. Air Force, 1968 - 1975
Aerospace Engineer, NASA, 1968

Academic Background

M.E., Mechanical Engineering, University of Houston, 1979
B.S., Mechanical Engineering, New Mexico State University, 1968
Completed NASA cooperative work-study program and U.S. Air Force ROTC

Registration

Licensed (Registered) Professional Engineer: Texas, No. 45901, 1979
Voluntary Continuing Professional Competency Program, Texas, 1998 – 2000 (Voluntary program discontinued)

Professional Honors

Alan J. Chapman Award, South Texas Section, ASME, 2005
Meritorious Service Award, South Texas Section, ASME, 2003
Meritorious Service Award, South Texas Section, ASME, 2002
Meritorious Service Award, South Texas Section, ASME, 2001
Meritorious Service Award, South Texas Section, ASME, 1999
Meritorious Service Award, South Texas Section, ASME, 1998
Commendation, South Texas Section, ASME, 1979
Military honors and awards associated with 111 combat missions as a fighter pilot in Vietnam and Cambodia and an instructor pilot in Texas
Outstanding Graduate, U.S. Air Force Undergraduate Pilot Training, 1970

Professional Society Memberships

American Society of Mechanical Engineers (ASME)
Member, 1975 - Present
Secretary/Treasurer, Northwest Houston Subsection, 1995 - 1997
Industry Relations Chair, South Texas Section, 1993 - 1995
Public Relations Chair, South Texas Section, 1991 - 1993
Member, National Society of Professional Engineers (NSPE) and Texas Society of Professional Engineers (TSPE), 1996 - Present
Pi Tau Sigma, National Mechanical Engineering Honorary Fraternity, 1966
Chapter President 1967 - 1968
Sigma Tau, National Engineering Honorary Fraternity, 1966

Professional Activities

Member, ASME Boiler and Pressure Vessel Code, Special Working Group on High Pressure Vessels (SCVIII, Section VIII, Division 3), and Task Group on Design "TGD", 1994, Appointment "Commission" expires September 2008
Member, ASME Boiler and Pressure Vessel Code, Task Group on Impulsively Loaded Vessels (SCVIII), 2003, Appointment "Commission" expires September 2008
Corresponding Member, ASME Boiler and Pressure Vessel Code, Project Team on Hydrogen Tanks, 2004, Appointment "Commission" expires June 2009

Member, ASME Board on Pressure Technology Codes and Standards (BPTCS) Task Force on Hydrogen Storage and Transport Tanks, 2003 – 2004

Course Coordinator and Instructor, South Texas Section ASME, Pressure Vessel Engineering Seminar; Design by Analysis, Fatigue Analysis, High Temperature Vessels, and Division 3. 1995 - 2005

Instructor, New Orleans Section ASME, The ASME Pressure Vessel Code in Fitness for Service Applications, 1998 - 2001

Publications and Presentations

Biel, Richard C., and Alexander, Christopher R.; "Applications of Limit Load Analyses to Assess the Structural Integrity of Pressure Vessels" PVP2005-71724, ASME, Denver CO, July 2005

Young, Kenneth; Alexander, Christopher R.; Biel, Richard C.; and Shanks, Earl, "Updated Design Methods for HPHT Equipment," SPE 97595, 2005 SPE Applied Technology Workshop on High Pressure/High Temperature Sour Well Design, Houston, TX, Society of Petroleum Engineers, 17 – 19 May 2005

Biel, Richard C. "Mechanics of Pressure Vessels," presentation to the Acoustic Emission Working Group, AEWG-48, Houston TX, May 2005

Biel, Richard C. "Applications of Limit Analyses," presentation at the ASME Plant Engineering & Maintenance Trade Show, Pasadena TX, April 2005

Alexander, Christopher R. and Biel, Richard C., "Certification Program for Assessing the Mechanical Integrity of Pressure Vessel Systems" PVP-Vol. 487, *Aging Management and License Renewal*, ASME, La Jolla CA, July, 2004

Alexander, Christopher R.; Jagodzinski J.; and Biel, Richard C., "Stress Analysis of the 46-Inch Reactor Feed / Effluent Heat Exchanger" PVP-Vol. 478, *Analysis of Bolted Joints*, ASME, 2004

Biel, Richard C. "Elements of a Pressure Vessel Certification Program" presentation at the ASME Plant Engineering & Maintenance Trade Show, Pasadena TX, April 2004.

Biel, Richard C. "API 510 Repair Avoids Lengthy Shutdown," Second Pan-American Conference for Nondestructive Testing, ASNT, Houston TX, June 2001

Alexander, Christopher R.; Biel, Richard C., et al., "Fitness for Service Evaluation of a Platformer Reactor Vessel," PVP-Vol. 359, *Fitness for Adverse Environments in Petroleum and Power Equipment*, ASME, Honolulu HI, July 1997

Biel, Richard C. "API-510, An Engineer's Perspective" presentation to the Greater Houston Section, ASNT, March 1995

Biel, Richard C. "Algor FEA Helps Shave 15,000 Lbs. From Huge Butterfly Valve," *Algor Design World*, January 1993.

Biel, Richard C. "FEA Shaves 15,000 Lbs. From Huge Butterfly Valve," *Design News*, November 1992.

Forensic Work

Mr. Biel has researched and investigated several matters concerning pressure vessels, piping, and general mechanical design. He has been deposed and has testified as an expert witness in several matters. He has testified internationally on intellectual property matters. He has prepared exhibits for use at trial that explain technical issues clearly. A complete listing of litigation work is available on request.

Engineering Designs and Analyses

Mr. Biel has designed, re-rated, and analyzed numerous pressure vessels and prepared Certified User's Design Specifications and Certified Manufacturer's Design Reports for ASME Code Section VIII, Divisions 1, 2, and 3 compliance. These calculations include thermal, cyclic fatigue, wind, transient loading, seismic analyses, and stresses due to external piping loads on nozzles and skirt/saddles. Many of these designs required detailed finite element analysis to adequately describe the stress conditions, including non-linear collapse and limit state calculations.

He has done several studies in high temperature structural material behavior during post weld heat treatment. He designed and analyzed specialty valves for refinery Fluidized Catalytic Cracking Unit (FCCU) catalyst and flue gas service up to 1,800°F as well as catalyst lines for service to 1400°F. His finite element analyses of thermal and elastic/plastic behavior of these valves and piping were used to prevent structural failure and assure function without excessive distortion or binding.

He has designed full product lines of conventional API land well head equipment including conventional and automatic slip-type casing hangers, mandrel casing and tubing hangers, packoff and stripper seals, valve removal plugs and tubing plugs with the associated running tools, and ancillary equipment. Mr. Biel designed, prototyped, and environmentally tested well head assemblies for Arctic gas service. As a consultant to a major oil company, he wrote specifications for Arctic service well heads. He has designed a family of well head gate valves from 2" through 6" - 2,000 psi; 1-13/16" through 4-1/16" - 10,000 psi; and 1-13/16" through 3-1/16" - 15,000 psi.

Mr. Biel has tested prototype valves and well heads under extreme environmental conditions including low and high temperatures and high pressure gas. He designed modifications to a test facility where he physically life cycle tested gate valves to 10,000 psi to evaluate wear and performance.

He was instrumental in the proposal, design and development of a facility to test hypervelocity impacts of pressurized propellant and oxidizer cylinders. This testing simulated collisions of space debris with spacecraft in near earth orbit.

Mr. Biel currently serves as a member of the ASME Special Working Group on High Pressure Vessels. This Code committee authors the ASME BPV Code, Section VIII, Division 3. He also serves on the associated Task Group on Design. His contributions to this Task Group have aided the preparation of the Code rules for these vessels. He formerly chaired a Task Group, within the Special Working Group, that reviewed new construction techniques for inclusion into the Code and was instrumental in the passage of Section VIII, Division 3, Code Case 2390 *Composite Reinforced Pressure Vessels*.

Miscellaneous

Mr. Biel has a current passport, and speaks some Spanish.