J. PAUL TULLIS

President, Tullis Engineering Consultants

EDUCATION

BS in Civil Engineering - Utah State University - 1961

Ph.D. in Civil Engineering - Utah State University - 1966

PROFESSIONAL EXPERIENCE

Registered Professional Engineer in Utah

1998-2015 President, Tullis Engineering Consultants

Professor of Civil & Environmental Engineering, Utah State University (Emeritus)

Senior Research Scientist, Utah State University Foundation (Emeritus)

1977-98 Professor of Civil Engineering, Utah State University and Professor of Civil Engineering, Colorado State University

1976-77 Professor of Civil Engineering, Colorado State University

1975-76 Visiting Assoc. Prof., Civil & Mechanical Engineering, University of Michigan, Ann Arbor, Michigan

1970-75 Assoc. Prof., Civil Engineering, Colorado State University

1966-70 Asst. Prof., Civil Engineering, Colorado State University

1963-66 Graduate Research Asst., Utah State University

1961-63 General Contractor, Milo Tullis Construction Company, Ogden, Utah

AWARDS AND HONOR

S Recipient of the American Society of Civil Engineers “Hydraulics Structures Medal”, July 1993.

Award by the College of Engineering at Utah State University in 1993, Outstanding Student Advisor.

Award by the College of Engineering at Utah State University in 1978, Outstanding Researcher.

Recipient of the American Society of Civil Engineers “Huber Research Prize” in 1977.

UNIVERSITY TEACHING EXPERIENCE

Undergraduate classes in statics, dynamics, strength of materials, fluid mechanics and applied hydraulics. Graduate classes on cavitation, hydraulic design, transients (water hammer & surge control), design of pipelines and pump and valve selection.

SHORT COURSES TAUGHT

Air Operated Valve (AOV) Short Course, “Valve Applications”. Orlando, Florida, February 1995.

Air Operated Valve (AOV) Short Course, “Valve Applications”. UWRL, Logan, Utah, August, 1995.

“Reliability and Expected Use of Dynamic Devices in a Water Dist. System.” Valencia, Spain, Nov, 1994.

“Control Valve Cavitation Short Course”, EPRI M & D Center, Philadelphia, Pennsylvania, August, 1994.

"Designing to Avoid Pipe Collapse" at Bari, Italy, May 1994.

“Valve Applications,” Air Operated Valve Short Course, EPRI M & D Center, Phil. PA, March, 1993-98.

“Check Valve Maintenance & Diagnostics.” EPRI M & D Center, Phil. PA January, 1993-98

“Use and Selection of Control Devices in Water Distribution Networks.” Valencia, Spain, Oct. 1991&92.

“Cavitation in Hydraulic Systems.” Sao Paulo, Brazil, July 1982.

RESEARCH AND CONSULTING EXPERIENCE

Valve Testing, Design and Application: Over 40 years experience consulting, testing and improving the design and performance of valves and valve installations. Worked for over 47 valve companies, and over 37 government agencies, engineering firms, and municipalities. Problems studies include cavitation, transients, noise, aeration, torque, flow capacity, seat leakage, cycle tests, pressure tests, wear tests, and general valve performance. Types of valves evaluated include butterfly, cone, ball, globe, piston, gate, multi-stage cavitation control, free discharge, sleeve, slurry, pinch, air release and check valves. Author of or contributer to12 books and chapters in engineering handbooks dealing with valves and pipelines.

Design, Analysis and Testing of Pipelines: Design of liquid sulfur pipeline, design of penstocks for hydropower plants. Design of an underwater pipeline and canal to transfer salt brine under the Great Salt Lake. Computer analysis of pipeline collapse due to surge pressures resulting from a pipeline break. Design, computer analysis and physical modeling of surge control devices including air chambers, surge tanks, stand pipes, pressure relief valves and surge anticipating valves. Design, computer analysis and laboratory testing of air vents and air release/vacuum breaking valves for pipelines. Computer analysis to develop safe methods to fill and operate pipelines and minimize surge and water hammer. Computer and physical modeling of column separation and the influence of trapped air on water hammer pressures in pipelines. Field testing and computer analysis of transients caused by starting and stopping pumps in pipelines.

Designing Analysis and Testing of pumping plants and pump intakes; Completed over seventeen hydraulic model studies of pump intake designs. Developed modifications to pump intake designs to improve performance. Field testing of pumping plants and pump intakes. Computer analysis of water hammer and surging caused by starting and stopping pumps. Laboratory testing of numerous types of pumps. Trouble shooting pumping problems at power plant and water treatment plants.

Basic and applied research in cavitation: Developing laboratory techniques to detect and quantify cavitation, produce design data, quantify size and pressure scale effects to enable model data to be properly applied to the prototype and study means of suppressing cavitation; especially aeration techniques. The scope of experience on cavitation research numerous includes work on hydraulic structures, recommendations for eliminating or avoiding cavitation in control valves, pumps and pipe systems and development of new pressure reducing equipment to reduce cavitation.

Hydraulic model studies: Design and analysis of overflow spillways, Labyrinth spillways, weirs, power intakes, trash racks, hydraulic jump energy dissipaters, plunge pool dissipaters, flip bucket dissipaters, drop structures crest gates, high head outlet gates, tunnels, tunnel intakes, supercritical flow channels, diversion structures, and Y-branches, pump intakes and valve installations. Items studied include investigations of gate sealing, cavitation, aeration, transients, pressure fluctuations, mean and fluctuating velocity distributions, stress and vibration analysis, vorticity, pre-rotation, discharge calibrations, erosion and general hydraulic performance. Computer simulation and field testing.

Drag reduction: Using polymer additives injected into the developing boundary layer of a pipe. Development of boundary layer diffusion, turbulence modification, reduction in wall shear stress and polymer degradation.

Design of civil works for small hydropower installations.

Analysis of vibrations and pressure surges in nuclear pump test loops.

Computer simulation of pulsatile blood flow in arteries and evaluation of the influence of single and multiple stenoses on flow rate, pulse pressure and mean pressure.

Flow meters: Selection, use and calibration.

Expert witness in cases involving valves, pumps, flow meters, pipeline design, pipeline failures, hydraulic transients (water hammer), cooling towers, cavitation problems and patent infringement.

PROFESSIONAL AND HONORARY SOCIETIES AND COMMITTEES

Member, American Society of Civil Engineers (ASCE)

Past member, the International Association for Hydraulic Research (IAHR)

Member, Phi Kappa Phi and Sigma Xi

Past Chairman, Hydraulic Structures Committee of ASCE, 1984-1985

Past Member, Task Committee of ASCE on Aeration and Cavitation

Past Publication Representative for ASCE Hydraulics Division Journal

Past Member ASCE Committee to Review Manual 25

Past Member of Cavitation Committee of IAHR

Past Member of Organizing Committee for Joint IAHR, ASCE and ASME Meeting, Ft. Collins CO, 1978

PUBLICATIONS

I have organized my publications under the following topics:

Books

(*) indicates authorship

1. Section 2.4 "Hydraulics of Pipe Systems" The CRC Handbook of Thermal Engineering, ed. Frank Krieth, CRC Press LLC 2000, pgs 2-44 to 2-60. (*)

2. Chapter 4, "Hydraulics of Pipe Systems", Fluid Mechanics, ed. Frank Krieth, CRC Press LLC 2000, pages 47-63.(*)

3. Section 3.4 - Hydraulics of Pipe Systems, (1998). The Handbook of Mechanical Engineering, ed. Frank Krieth, CRC Press., pgs. 3-44 to3-60. (*)

4. Section 38 - Valves, (1996). The Engineering Handbook, ed. Richard C. Dorf, CRC Press. January, pgs. 403-408. (*)

5. Control Valve Cavitation Guide. NUREG/CR-6031. Prepared for the Nuclear Regulatory Commission (NRC), 1993. (*)

6. Application Guidelines for Check Valves in Nuclear Power Plants. Electric Power Research Institute, 1993. (Kalsi Engineering, Inc., and *)

7. Hydraulics of Pipelines--Pumps, Valves, Cavitation, Transients. John Wiley & Sons 1989. (*)

8. Closed Conduit Hydraulics. Utah State University, Logan, UT, 1982. (*)

9. Cavitation in Hydraulic Systems. Sao Paulo, Brazil, July 1982, (prepared for short course in Brazil) (*)

10. Control of Flow in Closed Conduits. Litho-Crafters, Ann Arbor, Michigan, 1971, 557 p. (*, ed.)

PUBLICATIONS (related to valves and cavitation) Valve and Cavitation Refereed Journal Publications

1. Modeling Cavitation for Closed Conduit Flow. Journal of the Hydraulics Division, Proceedings of the American Society of Civil Engineers, ASCE, Vol. 107, No. HY11, November 1981. (*)

2. Cavitation Limits for Butterfly Valves. Presented and published in Cavitation Erosion in Fluid Systems, ASME, June 1981. (W. J. Rahmeyer, and *)

3. Cavitation in Butterfly Valves. Journal of the Hydraulics Division, ASCE, Vol. 99, No. HY9, Proc. Paper 9993, September, 1973, pp. 1303-1318. (J. W. Ball and *)

4. Cavitation Scale Effects for Valves. Journal of the Hydraulics Division, ASCE, Vol. 99, No. HY7, Proc. Paper 9874, July, 1973, pp. 1109-1128. (*)

5. Cavitation and Size Scale Effects for Orifices. Journal of the Hydraulics Division, ASCE, Vol. 99, No. HY3, Proc. Paper 9605, March, 1973, pp. 417-430. (* and R. Govindarajan)

6. Choking and Supercavitating Valves. Journal of the Hydraulics Division, ASCE, Vol. 97, No. HY12, Proc. Paper 8593, December, 1971, pp. 1931- 1945. (*)

7. Needle Valves as Pressure Regulators. Journal of the Hydraulics Division, ASCE, Vol. 95, No. HY5, Proc. Paper 6787, September, 1969, pp. 1633-1649. (* and M. L. Albertson)

8. Reducing Cavitation in Valves. Journal of the Hydraulics Division, ASCE, Vol. 94, No. HY6, Proc. Paper 6255, November, 1968, pp. 1475- 1488. (* and M. M. Skinner)

9. A Review of Cavitation Research on Valves. Journal of the Hydraulics Division, ASCE, Vol.94, No. HY1, Pro. Paper 5705, January, 1968, pp. 1-16. (* and B. W. Marschner)

Valve and Cavitation Journal Discussions

1. Cavitation Parameters for Outlet Valves. Journal of the Hydraulics Division, ASCE, Vol. 97, No. HY9, September 1971, pp. 1547-1552. (*)

2. Flow and Cavitation Characteristics of Control Valves. Journal of the Institution of Water Engineers, Vol. 23, No. 7, October 1969, London. (*)

3. Flow Characteristics of Butterfly and Spherical Valves. Journal of the Hydraulics Division, ASCE, Vol. 95, No. HY1, 1969. pp. 557-559. (*)

4. Fluctuations of Pressure in Conduit Expansions. Journal of the Hydraulics Division, ASCE, Vol. 93, No. HY3, 1967, pp. 197-201. (* and Maurice L. Albertson)

Valve and Cavitation Published in Conference Proceedings

1. Selecting Controls for Water Distribution Systems. Presented at the International Conference on on "Hydraulics of Pipelines", June 12-15, 1994, Phoenix, Arizona. (*)

2. Selection and Use of Control Devices in Water Distribution Networks. Presented at the International Conference on "Water Supply Systems State of the Art and Future Trends," October 13-19, 1992, Valencia, Spain. (*)

3. Cavitation Damage Characteristics of Valves. Proceedings of the ASME Conference on "Pressure Vessels and Piping," June 19-23, 1988, Pittsburgh, Pennsylvania. (*)

4. Valve Sizing to Avoid Cavitation. Proceedings of the Symposium on "EPRI Power Plant Valves", August 1987, Palo Alto, California. (*)

5. Cavitation in Cone Valves. Proceedings of the ASCE Conference on "Advancements in Aerodynamics, Fluid Mechanics, and Hydraulics," June 3-6, 1986, Minneapolis, Minnesota. (Bart L. Mumford and *)

6. Cavitation-Free, High Energy Loss Valve. Presented at National Engineering Laboratory Silver Jubilee Conference, Glasgow, Scotland, November 1979. (R. W. Barnes, *, and B. Dewart)

7. Modeling Cavitation for Closed Conduit Flow. Presented at the 24th Annual ASCE Hydraulics Division Specialty Conference, Purdue University, W. Lafayette, Indiana, August 4-6, 1976. (James W. Ball and *)

8. Downpull Forces on Stop Logs and Large Gates. Annual ASCE Convention, Denver, Colorado, November 3-7, 1975. (James W. Ball and *)

9. Incipient Cavitation Damage and Scale Effects for Sudden Enlargement Energy Dissipators. Presented at the ASCE Hydraulics Division Specialty Conference, Knoxville, Tennessee, July 31-August 3, 1974. (J. W. Ball, *, and T. E. Stripling)

10. Cavitation Data for Valves and Its Application. Proceedings for the Conference on Cavitation, The Institution of Mechanical Engineers, Heriot-Watt University, Edinburgh, Scotland, September 3-5, 1974. pp. 55-63. (* and James W. Ball)

11. Testing Valves for Cavitation. Proceedings for the Conference on Cavitation, The Institution of Mechanical Engineers, Heriot-Watt University, Edinburgh, Scotland, September 3-5, 1974, pp. 45-54. (*)

12. Application on Cavitation Information for Design and Analysis of Closed Conduit Systems. Presented at the Institute on Control of Flow in Closed Conduits, Colorado State University, Fort Collins, Colorado, August 9-14, 1970. (*)

13. Problems with Recent High Head Gate Installations. Presented at the IAHR Symposium, Stockholm, Sweden, Transactions, IAHR, Part 1, F1, August 1970. (B. T. A. Sagar and *)

14. Predicting Cavitation in Valves. Presented at the IAHR Symposium, Stockholm, Sweden, Transactions, IAHR, Part 1, G5, August, 1970. (*, R. A. Hoggan, and N. C. Whittington)

15. Incipient Cavitation Damage and Scale Effects for Sudden Enlargement Energy Dissipators. Presented at the ASCE Hydraulics Division Specialty Conference, Knoxville, Tennessee, July 31-August 3, 1974. (J. W. Ball, *, and T. E. Stripling)

Unpublished Papers and Reports (Partial listing)

1. Evaluation of Injector Nozzle Cavitation. Prepared for Caterpillar, May 2002.

2. Cavitation analysis of Plug Valves for Swan Island Pump Station, Portland OR., Colollo Engineers, Nov. 2001 - July 2002

3. Analysis of Pressure Relief Valve Mal-function Leading to the Failure of the Olympic Pipeline. Prepared for Susman Godfrey LLP and Jacobs Engineering Feb 2002.

4. Evaluation of Cavitating Orifices at a Nuclear Power Plant in Korea, Prepared for Westinghouse, May 2001

5. Comanche Peak 18" Butterfly Valve Cavitation Analysis. Prepared for Altran Corp. Oct. 2000.

6. Safe Closing and Opening Times for Pipeline Valves. Prepared for San Francisco Public Utilities Commission, Sept. 2000 (*)

7. Analysis of the Yanbu-Madina Pipeline Ball Vaves. Prepared for the Techint, Saudi Arabia, July 2000. (*)

8. Cavitation in Closed Conduits. Presented to the Boston section of ASCE, January 1980. (*)

9. Design of a Pressure-Reducing Structure for the Soldier Canyon Water Treatment Plant. Report prepared for the City of Fort Collins, March 1974. (*)

10. Predicted Cavitation Performance and Testing Procedures for 60-Inch Butterfly Valves. Report prepared for the Department of the Army Waterways Experiment Station Corps of Engineers, Vicksburg, Mississippi, March 1974. (*)

11. Cavitation and Vibration Analysis of a 3-Meter Butterfly Valve. Prepared for Rockwell International, August, 1973. (*)

12. Cavitation Characteristics of Ball and Butterfly Valves. Presented at the ASCE Annual Meeting and National Meeting on Environmental Engineering, Chicago, Illinois, October 1969. (Raymond A. Hogan and *)

13. Recommended Modifications to the Cheesman Outlet Works. Prepared for Denver Board of Water Commissioners, Denver, Colorado, September 1969. (*, M. L. Albertson and Sellards and Grigg, Inc.)

14. Study of the Raw Water Throttling Valves at Ralston Treatment Plant. Prepared for the City of Arvada, Colorado, February 1969. (*, Sellards and Grigg, Inc.)

15. Proposed Modifications to the Gross Dam Outlet Works. Prepared for Denver Board of Water Commissioners, Denver, Colorado, November 1968. (M. L. Albertson, *, and Sellards and Grigg, Inc.)

Valve and Cavitation Reports (Utah State University)

1. Hydraulic Testing of a 6-Inch Fixed Cone Valve. Conducted for Hartman Valve Corp. March 1997. (Robert E. O'Dell and *)

2. Evaluation of Nonintrusive Diagnostic Technologies for Check Valves (NIC-03-STEAM). March 1996. (*)

3. Evaluation of Nonintrusive Diagnostic Technologies for Check Valves (NIC-02-AIR). February, 1993. (*)

4. Evaluation of Nonintrusive Diagnostic Technologies for Check Valves (NIC-01). Volume 1, Summary. February 1991. (*, W.J. Rahmeyer, Muin S. Baasiri and Steven L. Barfuss)

5. 2-1/2-inch Angle Lift Check Valve Test. Conducted for Anchor/Darling. April 1996. (Steven L. Barfuss and *)

6. Flow and Pressure Drop Tests for a 24-inch Komax Mixer. Conducted for Komax Systems. February 1996. (* and Steven L. Barfuss)

7. Calibration of 14-inch Sleeve Valve. Conducted for Lindsey Fabricators. September 1995. (*)

8. Flow Calibration of a Cla-Val 24-inch Globe Valve. Conducted for Cla-Val Company. June 1995. (*, Steven L. Barfuss)

9. Performance Flow Tests on a Three-Inch 300 lb. Globe Valve. Conducted for Anchor/Darling Valve Co. July 1994. (Steven L. Barfuss, and *)

10. Flow and Torque Tests on 8- and 30-inch C & S Butterfly Valves. Conducted for Duke Power, C & S Valve Company and Vectra, March 1994. (*, and Steven L. Barfuss)

11. Model Study of a 14-inch Sleeve Valve. Conducted for Kvaerner Hydro Power, April 1994. (*, and Steven L. Barfuss)

12. Cavitation Testing of a Singer 6-inch 100-PG-AG Power Operated Globe. Conducted for Singer Valve Co., November 1993. (Michael C. Johnson, and *)

13. Flow Calibration of a 6-inch Check Valve, Serial #ET491-1-1. Conducted for Anchor Darling Valve Co., November 1993. (Steven L. Barfuss, and *)

14. Calibration of a 6-inch Swing Check Valve. Conducted for Anchor Darling Valve Co., November, 1993. (Steven L. Barfuss, and *)

15. Cavitation Analysis of the Isolation Valve at Kirkwood Power Plant. Conducted for Hetch Hetchy Water District, October, 1993. (*)

16. Analysis of Moccasin By-Pass Valves. Conducted for City of San Francisco Public Utilities Commission, May 13, 1993. (*)

17. Testing of 10" and 42" Fisher (Posi-Seal) Butterfly Valves. Conducted for Fisher Controls and Duke Power Company, March 1993. (*)

18. Calibration of a 28" Globe Valve. Conducted for Cla-Val, February 1993. (*)

19. -Inch Anchor Darling Check Valve. Conducted for Duke Power, June 1992. (*)

20. Calibration of 1.5-inch and 2-inch Orifice Plates. Conducted for New York Power Authority, April 1992. (*)

21. Hydraulic Testing of a 12-inch Swing Check Valve. Conducted for Atwood and Morrill Co., Inc., February 1992. (* and Steven L. Barfuss)

22. Hydraulic Tests on APCO Check Valves and Control Valves. Conducted for APCO Valve and Primer Corporation, November 1991. (*)

23. Flow and Torque Tests on a 24-inch Butterfly Valve. Conducted for ENPRO Systems Inc., June 1991. (*)

24. Flow Testing of 1.5-inch Piston Check Globe Valve. Conducted for Anchor/Darling Valve Company, May 1991. (*)

25. Flow and Torque Tests on a 12-inch Ball Valve. Conducted for Hartman Valve Company, May 1991. (*)

26. Hydraulic Testing of a 14-inch Y-Pattern Lift Check Valve. Conducted for Anchor/Darling Valve Company, September 1990. (* and Steven L. Barfuss)

27. Evaluation of Non-Intrusive Diagnostic Technologies for Check Valves. Conducted for NIC/EPRI, August 1990. (* and William J. Rahmeyer)

28. A Model Study of Control Valves for Lake Youngs Dam. Conducted for Ebasco, May 1990. (* and Blake P. Tullis)

29. Flow, Cavitation, Torque and Performance Tests on a 16-inch Ball Valve. Conducted for Williamette Valve Co., January 1990. (Blake P. Tullis, Muin Baasiri and *)

30. Hydraulic Testing of a 12-inch Sleeve Valve. Conducted for Hartman Valve Company, October 1989. (*)

31. Performance Flow Tests on an 8-inch 600 lb. Globe Valve. Conducted for Anchor/Darling Valve Co., July 1989. (*)

32. Performance Flow Tests on an 8-inch 600 lb. Globe Valve. Conducted for Anchor/Darling Valve Co., May 1989. (*)

33. Flow Calibration, Cavitation and Sound Tests of a 2-inch 1878 lb. Reduce Port Globe Valve. Conducted for Anchor/Darling Valve Co., March 1989. (*)

34. Flow Calibration, Cavitation and Sound Tests of a 2-foot 1878 lb. Full Port Globe Valve. Conducted for Anchor/Darling Valve Co., March 1989. (*)

35. Calibration of 6-inch Free Discharge Valve. Conducted for Hartman Valve Corporation, February 1989. (*, and Steven L. Barfuss)

36. Gate Valve Tests. Conducted for Stockham Valve Company, January 1988. (*)

37. Pipeline and Pumpstation Analysis. Conducted for Northglenn City, Colorado, May 1988. (*)

38. Yough Hydro Model Study. Conducted for D/R Hydro, March 1988. (*)

39. Control Valve Calibrations. Conducted for Ross Valve Manufacturing Company, December 1987. (Steven L. Barfuss and *)

40. Control Valve Calibrations. Conducted for Ross Valve Manufacturing Company, December 1987. (Steven L. Barfuss and *)

41. Globe Valve Tests. Conducted for Anchor/Darling Valve Company, November 1987. (* and Steven L. Barfuss)

42. Hytrol Valve Cavitation Tests. Conducted for Cla-Val Company, November 1987. (* and Blake P. Tullis)

43. Fire Hydrant Calibration. Conducted for Long Beach Iron Works, Inc., October 1987. (* and Blake P. Tullis)

44. Fire Hydrant Calibration. Conducted for Long Beach Iron Works, Inc., October 1987. (* and Blake P. Tullis)

45. Fire Hydrant Calibration. Conducted for Long Beach Iron Works, Inc., October 1987. (* and Blake P. Tullis)

46. Calibration of a Model B125N Fire Hydrant With Clutch Assemblies. Conducted for Long Beach Iron Works, Inc., September 1987. (* and Blake P. Tullis)

47. Calibration of a Model B125N/110N Fire Hydrant. Conducted for Long Beach Iron Works, Inc., September 1987. (* and Blake P. Tullis)

48. Calibration of a Model B125N Fire Hydrant. Conducted for Long Beach Iron Works, Inc., September 1987. (* and Blake P. Tullis)

49. Calibration of a Model B125 Fire Hydrant. Conducted for Long Beach Iron Works, Inc., September 1987. (* and Blake P. Tullis)

50. Flow Calibration, Cavitation and South Tests of a 0.5 inch 1878# Globe Valve. Conducted for Anchor/Darling Valve Company, August 1987. (* and Blake P. Tullis)

51. Performance Tests of a Hartman 14" x 16" Split Volute Multijet Sleeve Valve. Conducted for Progressive Fabricators/Hartman Valve Corp (Joint Venture), June 1987. (*)

52. Flow Calibration, Cavitation, and Sound Tests of a 1.5", 1878# Swing Check Value. Conducted for Anchor/Darling Valve Company, December 1986. (*)

53. Flow Calibration, Cavitation, and Sound Tests of a 1.5", 1700# Double Disc Gate Valve. Conducted for Anchor/Darling Valve Company, December 1986. (*)

54. Flow Calibration, Cavitation, and Sound Tests on a 10", 300 lb. Globe Valve with Standard Disc. Conducted for Anchor/Darling Valve Company, October 1986. (*)

55. Flow Calibration, Cavitation, and Sound Tests on a 10", 300 lb. Globe Valve with Parabolic Disc. Conducted for Anchor/Darling Valve Company, October 1986. (*)

56. Performance Tests on the Feed Water Check Valves for the San Onofre Unit I Nuclear Power Plant, Phase B. Conducted for Bechtel Power Corporation, Norwalk, California, January 1987. (*)

57. Performance Tests on the Feed Water Check Valves for the San Onofre Unit I Nuclear Power Plan Phase A. Conducted for Bechtel Power Corporation, Norwalk, CA, May 1986. (* and William J. Rahmeyer)

58. Qualification Testing of 4 and 8 Inch Butterfly Valves. Conducted for XOMOX Corporation, August 1985. (*)

59. Performance Test of an 8" Gate Valve. Conducted for Mueller Valve Company, April 1985. (*)

60. Qualification Testing of 4, 8, and 14 Inch Butterfly Valves. Conducted for XOMOX Corporation, February 1985. (*)

61. Calibration of a 16 x 20 Inch Channelstream Angle Valve. Conducted for Valtek, Springville, Utah. (*)

62. Performance Test of an 8" Gate Valve. Conducted for Mueller Valve Company, December 1984. (*)

63. Seat Performance Tests of a 14-Inch Class 250 Cone Valve. Conducted for McNally-Pittsburg Corporation, November 1984. (*)

64. Cavitation Intensity Testing on a Sectional Model of Channelstream Valve. Conducted for Valtek and Carolina Power and Light, October 1984. (*)

65. Cavitation, Sound, Torque and Cv Tests on a 6" Butterfly Valve. Conducted for Copes-Vulcan, July 1984. (*)

66. Seat Performance Tests on 24" Butterfly Valves. Conducted for Mueller Valve Company, January 1984. (Revised August 1984) (*)

67. Cavitation and Sound Testing on a 1.5" 2500# Gate Valve. Conducted for Anchor/Darling Valve Company, January 1984. (*)

68. Flow Calibration of a 16-Inch Tilt Disc Check Valve. Conducted for Anchor/Darling Valve Co., November 1983. (*)

69. Torque and Cv Tests on a 24-Inch Ball Valve. Conducted for McNally- Pittsburg, Inc., Pittsburg, Kansas, November 1983. (*)

70. Cavitation and Sound Tests on a 10-Inch 1500# Tilt Disc Check Valve. Conducted for Anchor/Darling Valve Company, September 1983. (*)

71. Torque Cavitation, Flow Calibration of a 36" Butterfly Valve. Conducted for Mueller Valve Co., August 1983. (*)

72. Cavitation and Sound Tests on a 20-inch 150# Stop/Lift Check Valve. Conducted for Anchor/Darling Valve Company, July 1983. (*)

73. Cavitation and Sound Tests on an 8-inch 150# Stop/Lift Check Valve. Conducted for Anchor/Darling Valve Company, July 1983. (*)

74. Cavitation and Sound Tests on a 6-inch 900# Tilt Disk Check Valve. Conducted for Anchor/Darling Valve Company, July 1983. (*)

75. Cavitation Tests on a Four-Inch Valve with Various Internal Trims. Conducted for Valtek, May 1983. (*)

76. Flow Calibration of Keystone Butterfly Valves. Conducted for Keystone Valve Company, April 1983. (*)

77. Calibration of a 24-Inch Valtek Butterfly Valve. Conducted for VALTEK, March 1983. (*)

78. Cavitation and Sound Test on a 16" 150 psi Swing Check Valve without Counter Weight. Conducted for Anchor/Darling Valve Company, November 1982. (*)

79. Cavitation and Sound Test on a 16" 150 psi Swing Check Valve with Counter Weight. Conducted for Anchor/Darling Valve Company, November 1982. (*)

80. Calibration of a 30-Inch Tiger Tooth Sodium Valve. Conducted for Valtek, Springville, Utah, August 1982. (*)

81. Cavitation and Sound Test on a 16" 900 psi Tilting Disc Check Valve. Conducted for Anchor/Darling Valve Company, June 1982. (*)

82. Cavitation and Sound Test on a 6" 150 psi Swing Check Valve. Conducted for Anchor/Darling Valve Company, June 1982. (*)

83. Hydraulic Flow Tests on a 24, 12, and 6 Inch Motionless Mixers. Conducted for Keystone Valve Company, March 1982. (* and W. D. South)

84. Torque Cavitation, Flow Calibration of a 36" Butterfly Valve. Conducted for Keystone Valve Company, March 1982. (* and Wm. Darrell South)

85. Cavitation and Sound Test on a 6" 1500 PSI Globe Valve. Conducted for Anchor Darling Valve Company, July 1981. (*)

86. Cavitation and Sound Test on a 16" 300 PSI Globe Valve with Throttling Disc. Conducted for Anchor Darling Valve Company, July 1981. (*)

87. Cavitation and Sound Test on a 16" 300 PSI Globe Valve. Conducted for Anchor Darling Valve Company, July 1981. (*)

88. Cavitation and Sound Test on a 12" 150 PSI Swing Check Valve. Conducted for Anchor Darling Valve Company, May 1981. (*)

89. Torque Cavitation and Flow Calibration of a 6" Butterfly Valve. Conducted for Keystone Valve Company, May 1981. (W. D. South and *)

90. Cavitation and Sound Test on a 8" 150 PSI Globe Valve. Conducted for Anchor Darling Valve Company, February 1981. (*)

91. Cavitation and Sound Test on a 4" 900 PSI Tilt Disk Check Valve. Conducted for Anchor Darling Valve Company, March 1981. (*)

92. Cavitation and Sound Tests on a 2.5" 150 psi Gate Valve. Conducted for Anchor/Darling Valve Company, September 1980. (*)

93. Cavitation and Sound Test on a 4" 900 psi Globe Valve. Conducted for Anchor/Darling Valve Company, August 1980. (*, D. G. Chadwick, and Wm. Darrell South)

94. Hydraulic Tests on Cla-Val Company 6-Inch HYTROL Valves. Conducted for Cla-Val Company, April 1980. (* and Hebert Riehl)

95. Cavitation of Perforated Orifices Plates - Phase B. Conducted for Stone & Webster Engineering Corp., April 1980.

96. Comparison of Torque and Cv Characteristics of Several Leaf Designs for a 24-Inch Butterfly Valve. Conducted for McNally-Pittsburg Corp., January 1980. (*)

97. Hydraulic Tests of a 24-Inch Class 900 MCC Pacific Check Valve. Conducted for Pacific Valve Company, December 1979. (W. J. Rahmeyer and *)

98. Cavitation Damage Tests on Multi-Hole Orifice Plates. Conducted for Stone & Webster Engineering Corp., November 1979. (*)

99. Cavitation Damage Tests on 16-Inch Butterfly Valve and 90o Elbow. Conducted for Stone & Webster Engineering Corp., November 1979. (*)

100. 6-Inch Cavitating Venturi Performance Test. Conducted for Stone and Webster Engineering Corp., November 1979. (* and Wm. Darrell South)

101. Calibration of a 30-Inch Tiger Tooth Sodium Valve. Conducted for Valtek Company, October 1979. (*)

102. Cavitating Venturi Performance Test. Conducted for Stone & Webster Engineering Corporation, August 1979. (*, Wm. Darrell South and Herbert Riehl)

103. Analysis of the Control Valves for the Sound Suppression System at the Shuttle Launch Pad. Conducted for Reynolds, Smith and Hill, August 1979. (*)

104. Calibration of Waeco Valves. Conducted for Waeco Division of Powell Industries, July 1979. (*, Herbert Riehl and Wm. Darrell South)

105. Cavitation and Discharge Calibration of Media Butterfly Valves. Conducted for Media Valve Company, April 1979. (*)

106. Model Study of 60-Inch Turbine Shut-Off Plug Valve for Pyramid Power Plant. Conducted for Bingham-willamette Company, March 1979. Volumes 1 and 2. (*)

107. Calibration Tests on Xomox 16-Inch Equal and Unequal Venturis. Conducted for Xomox Corporation, January 1979. (*)

108. Calibration of a 1/2-Inch Waeco Valve. Conducted for Powell Industries, Waeco Division, January 1979. (*)

109. Flow Tests of a 24-Inch Flanged Butterfly Valve. Conducted for Center Line, Inc., April; 1978. (Calvin G. Clyde and *)

110. Torque and Discharge Calibration of a 12-Inch Diameter McNally-Pittsburg Cone Valve. Conducted for McNally-Pittsburg Manufacturing Corporation, November 1978. (*)

111. Hydraulic Tests on Cla-Val Company Hytrol Valves. Conducted for Cla-Val Company, March 1978. (* and Wm. Darrell South)

112. Hydraulic Tests on Series C Valves. Conducted for the Clarkson Company, February 1978.

113. Torque and Discharge Calibration of a 24-Inch Diameter McNally-Pittsburg Butterfly Valve. Conducted for McNally-Pittsburg Manufacturing Corporation, June 1977. (*)

Valve and Cavitation Reports (Colorado State University)

1. Flow and Torque Calibration of 6-Inch Flow Seal Butterfly Valves. Conducted for Flow Seal Corp., October 1979. (W. J. Rahmeyer and *)

2. Flow Tests of a 30-Inch Double Disc Gate Valve. Conducted for Anchor Darling, October 1979. (*)

3. Flow Tests on 20 and 24-Inch Recirculating Flow Control Valves. Conducted for ITT Hammel-Dahl Conoflow, June 1979. (*)

4. Cavitation Damage Tests on a Sectional Model of a 30-Inch Sodium Valve. Conducted for Valtek, January 1979. (*)

5. Report on Model Tests for the Improvement of Flow Control at Kensico South Effluent Chamber of the Delaware Aqueduct. Conducted for the New York Board of Water Supply, New York, July 1978. (*)

6. Cavitation, Torque and Discharge Calibration of a 6-Inch HPB Valve. Conducted for Xomox Corporation, Cincinnati, Ohio, August 1978. (*)

7. Cavitation and Torque of 6- and 12-Inch Center Line Butterfly Valves. Conducted for MCC Center Line, Tulsa, Oklahoma, April 1978. (*)

8. Report of Hydraulic Tests on 1:5.333 Scale Model of the Modification to the Flow control System at Kensico. Conducted for the City of New York Board of Water Supply, October 1976. (James W. Ball, *, and W. J.Rahmeyer)

9. Progress Report of Hydraulic Tests on 1:5.333 Scale Model of the Modification to the Flow Control System at Kensico. Prepared for the City of New York Board of Water Supply, January 1976. (James W. Ball and *)

10. Report of Hydraulic Tests, 16-Inch Cold Leg Check Valve. Conducted for Foster Wheeler Corporation and Atwood Morrill Company, June 1974. (James W. Ball and *)

11. Flow Test of the 28-Inch HLI Valve. Conducted for Foster Wheeler Corporation, November 1973. (*)

12. Report of Hydraulic Tests, 10-Inch Articulated Swing Check Valve. Conducted for Westinghouse Electric Corporation, November 1973. (James W.Ball, *, and Charles E. Sweeney)

13. Report of Hydraulic Tests, 14-Inch Articulated Swing Check Valve. Conducted for Westinghouse Electric Corporation, November 1973. (James W.Ball, *, and Charles E. Sweeney)

14. Performance of a 24-Inch Wafer Sphere Valve. Prepared for Jamesbury Corporation, September 1973. (*)

15. Model Study of a 48-Inch Needle Valve. Conducted for the City of New York Board of Water Supply, March 1973. (* and James W. Ball)

16. Report of Flow Tests - 18-Inch Stainless Steel Gate Valve. Conducted for Crane Company, October 1972. (* and James W. Ball)

17. Hydraulic Tests on 8- and 12-Inch Ball Valves. Conducted for Jamesbury Corporation, July 1972. (*)

18. Flow Tests on a 24-Inch Stainless Steel Gate Valve. Conducted for Crane Company, March 1972. (*)

19. Calibration of 6- and 14-Inch Ballast Valves. Conducted for Golden Anderson Valve Specialty Company, March 1972. (*)

20. Hydraulic Testing of a 6-Inch Butterfly Valve. Conducted for Center Line Inc., August 1971. (*)

21. Hydraulic Testing of a 16-Inch Butterfly Valve. Conducted for Clow Corporation, October 1971. (*)

22. Hydraulic Testing of 6- and 10-Inch Xomox Butterfly Valves. Conducted for Xomox Corporation, October 1971. (*)

23. Hydraulic Tests on 2-, 3-, and 4-Inch Ball Valves and 4- and 6-Inch Butterfly Valves. Conducted for Jamesbury Corporation, October 1970. (*)

24. Torque, Cavitation and Discharge Calibration of 6- and 12-Inch Butterfly Valves. Conducted for DeZurik Corporation, January 1970. (*)

25. Flow Tests on a 24-Inch Swing Check Valve. Conducted for Blaw-Knox Company, February 1969. Not available for distribution. (*)

26. Discharge Calibration of a 12-Inch Model Butterfly Valve. Conducted for Willamette Iron and Steel Company, January 1969. (*)

27. Cavitation and Discharge Characteristics of a 16-Inch Willamette Ball Valve. Conducted for Willamette Iron and Steel Company, January 1969. (*)

28. Flow Characteristics of a 12-Inch Surge Arrestor Valve. Conducted for Golden Anderson Valve Specialty Company, January 1969. (*)

29. Torque, Cavitation and Discharge Calibration of a 12 x 10-Inch Larner Johnson Needle Valve. Conducted for Darling Valve and Manufacturing Company, August 1968. (*)

30. Torque, Cavitation and Discharge Calibration of a 12-Inch Butterfly Valve. Conducted for Jamesbury Corporation, August 1968. (*)

31. Torque, Cavitation and Discharge Calibration of 6, 12, and 20-Inch Butterfly Valves. 2 vols. Conducted for DeZurik Corporation, July 1968.(*)

32. Torque and Discharge Calibration of an 8-inch Butterfly Valve. Conducted for Jamesbury Corporation, May 1968. (*)

33. Discharge Calibration and Cavitation Investigation of a 12-inch Needle Valve. Conducted for Darling Valve and Manufacturing Co., September 1967. (*)

34. Hydraulic and Cavitation Characteristics of Valves. 2 Vols. Conducted for the Metropolitan Water District of Southern California through Bechtel Corporation, June 1967. (M. L. Albertson, *, and Charles W. Thomas) Major professor for numerous MS Theses and PhD dissertations involving research on Cavitation at Utah State University and Colorado State University

PUBLICATIONS (related to water hammer/surge/transients)

Refereed Journal Publications

1. Multiple Subcritical Arterial Stenoses: Effect on Poststenotic Pressure and Flow. Annals of Surgery, 1976. (D. P. Flanigan, *, V. L. Streeter, W. M. Whitehouse, Jr., W. Fry, and J. C. Stanley)

2. Waterhammer Analysis with Air Release. Proceedings, Second International Conference on Pressure Surges, The City University, London, September 22-24, 1976. (*, V. L. Streeter, and E. B. Wylie)

Published in Conference Proceedings

1. Pipe Collapse Caused by a Pipe Rupture - A Case Study. Proceedings of the International Meeting on "Hydraulic Transients With Water Column Separation," September 4-6, 1991, Valencia, Spain. (*, and Reynold Watkins)

2. Influence of Entrapped Air on Transients. Presented at the International Conference on Transients, Sao Paulo, Brazil, July 1982. (*)

3. Air Release During Column Separation. Presented at the ASME Winter Annual Meeting December 1981 in Washington, D.C.

4. Water Hammer Analysis with Air Release. Presented at the 2nd International Conference on Pressure Surges, BHRA, London, September 22-24, 1976. (*, V. L. Streeter and E. B. Wylie)

Unpublished Papers and Reports

1. Transient Analysis of the San Joaquin Pipeline. Prepared for San Francisco Public Utilities Commission, Sept. 2000

2. Computer Modeling Multiple Arterial Stenoses. 1976. (*)

3. Multiple Arterial Stenosis: Effects on Flow and Post Stenotic Pressure. 1976. (*)

Major professor for several MS theses and PhD dissertations on transient problems.

PUBLICATIONS (related to hydraulic structures and model studies)

Referred Journals

1. Design Procedure for Labyrinth Spillways. ASDSO Newsletter, Association of State Dam Safety Officials, Inc., Vol. 8, No. 6, November 1993. (*, Nosratollah Amanian and David Waldron)

2. Design and Applications of Labyrinth Spillways. ASDSO Newsletter, Association of State Dam Safety Officials, Inc., Vol. 8, No. 5, September 1993. (Nosratollah Amanian and *)

3. Some Design Factors for the Bath County Trashracks. Water Power and Dam Construction. Aug. 1982. (W. S. Hamilton and *)

4. Downpull on Vertical Lift Gates. Water Power and Dam Construction, December, 1979, pp. 35-41. (B. T. A. Sagar and *)

Conference Proceedings

1. Utah Model Saves Texas a Million. ASDSO Conference Proceedings, Las Vegas, NV, October 1998, (B.P. Tullis, (*) and R Frithiof)

2. Real World Problems Reinforce Fundamentals in the Classroom. ASCE 1999 International Water Resources Engineering Conference, Seattle, WA, August 1999 (B. P. Tullis and (*))

3. Spillway Models. Proceedings of the International Conference on "The Hydraulic Modeling of Civil Engineering Structures," BHRA, Sept. 1982, Coventry, England. (* and W. J. Rahmeyer)

4. Investigation Into the Failures of Large Cooling Tower Lift Pumps. Proceedings of the Symposium on "Operating Problems of Pump Stations and Power Plants," Sept. 1982, Amsterdam. (Rex Elder and *)

5. Velocities and Periodic Forces for Trashracks. Hydraulic Specialty Conference, ASCE, Aug. 17-20, 1982, Jackson, Mississippi. (W. Hamilton and *)

6. Downpull Forces on Stop Logs and Large Gates. Annual ASCE Convention, Denver, Colorado, November 3-7, 1975. (James W. Ball and *)

7. Incipient Cavitation Damage and Scale Effects for Sudden Enlargement Energy Dissipators. Presented at the ASCE Hydraulics Division Specialty Conference, Knoxville, Tennessee, July 31-August 3, 1974. (J. W. Ball, *, and T. E. Stripling)

8. Problems with Recent High Head Gate Installations. Presented at the IAHR Symposium, Stockholm, Sweden, Transactions, IAHR, Part 1, F1, August 1970. (B. T. A. Sagar and *)

Hydraulic Structure Reports (Utah State University)

1. Model Study of the River Mountain Water Treatment Facility Flow Split Basin. Conducted for Montgomery Watson/CH2M Hill. October 1996. (* and Steven L. Barfuss)

2. Eastside Reservoir Project. Conducted for Kvaerner. September 1996. (* and Steven L. Barfuss)

3. Model Study of Wirtz Dam. Conducted for Freese and Nichols. June 1995 (*, and Steven L. Barfuss)

4. Standley Lake Dam Model Study. Conducted for the City of Westminster CO., September 1993. (*)

5. Stacy Dam Service Spillway Model Study. Conducted for the Colorado River Municipal Water District, May 1981. (William J. Rahmeyer, and *)

6. Model Study of the Hubbard Creek Spillway. Conducted for Freese and Nichols, Inc., May 1993. (*, and Steven L. Barfuss)

7. Model Study of The Buchanan Dam 7-Gate Spillway. Conducted for Freese and Nichols, Inc. and Lower Colorado River Authority (LCRA), May 1993. (*, and Steven L. Barfuss)

8. Lake Weatherford Dam Model Study. Conducted for HDR Engineers, August 1992. (*)

9. Model Study of the Morris Sheppard Dam Spillway. Conducted for Freese and Nichols, June 1992. (*)

10. Report on Model Study of the Bay City Dam. Conducted for Freese and Nichols, June 1992. (*)

11. Model Study of Service Spillway for Lake Alan Henry Dam. Conducted for Freese and Nichols, Inc., October 1989. (*)

12. Model Study of the Inlet/Outlet for the Muck Valley Hydro Project. Conducted for CH2M-Hill, June 1989. (*)

13. Model Study of the Intake and Tunnel for the Muck Valley Hydro Project. Conducted for Malacha Hydro, June 1989. (*)

14. Model Study of Applewhite Dam Service Spillway. Conducted for Freese and Nichols, Inc., March 1989. (*, and Steven L. Barfuss)

15. Yough Hydro Project Model Study. Conducted for D/R Hydro, May 1988. (* and Steven L.Barfuss)

16. Yough Hydro Model Study. Conducted for D/R Hydro, March 1988. (*)

17. Morris-Sheppard Model Study. Conducted for Brazos Rivers Authority and Freese and Nichols, Inc., August 1988. (*, William J. Rahmeyer, and Steven L. Barfuss)

18. Model Study of the Hydro-Power Intake for the City of Waco, Texas. Conducted for Ingersoll-Rand, June 1987. (*)

19. Swatara Dam Spillway Model Study. Conducted for Terraqua Incorporated, April 1985. (*)

20. Applewhite Dam Service Spillway Model Study. Conducted for the San Antonio City Water Board and Freese and Nichols, Inc., February 1984.(*)

21. Model Study of the Y-Branch in Tunnel 3 at Tarbela Dam. Conducted for Tippetts-Abbett-McCarty-Stratton, June 1983. (* and Wm. Darrell South)

22. Model Study of the Y-Branch in Tunnel 3 at Tarbela Dam. Conducted for TAMS Engineering, October 1981. (*)

23. Richland Dam Service Spillway Model Study. Conducted for Tarrant County Water Control and Improvement District Number 1, and Freese and Nichols, Inc., December 1980. (*, W. R. Rahmeyer, and W. D. South)

24. Model Study for Bath County Pump-Turbine Project. Conducted for Harza Engineering Corp., April 1980. (* and Wm. Darrell South)

Hydraulic Structure Reports (Colorado State University)

1. Design of a Pressure-Reducing Structure for the Soldier Canyon Water Treatment Plant. Report prepared for the City of Fort Collins, March 1974. (*)

2. Model Studies of the Outlet Gates for Tunnels 3 and 4, Tarbela Dam Project. Colorado State University, Dept. of Civil Engineering, CER69- 70SK28. Prepared for Tippetts, Abbet, McCarthy and Stratton, April 1970. (S. Karaki, A. G. Mercer and *)

3. Eagle Mountain Dam Spillway Model Study - Revised Design. Colorado State University, Department of Civil Engineering, CER69-70JPT20. Prepared for Freese, Nichols and Endress, November 1969. (*)

4. Recommended Modifications to the Cheesman Outlet Works. Prepared for Denver Board of Water Commissioners, Denver, Colorado, September 1969. (*, M. L. Albertson and Sellards and Grigg, Inc.)

5. Proposed Modifications to the Gross Dam Outlet Works. Prepared for Denver Board of Water Commissioners, Denver, Colorado, November 1968. (M. L. Albertson, *, and Sellards and Grigg, Inc.)

6. Eagle Mountain Dam Spillway Model Study. Colorado State University, Department of Civil Engineering, CER68JPT-SK11. Prepared for Freese, Nichols and Endress, September 1968. (* and S. Karaki)

7. Report on Model Tests for the Improvement of Flow Control at Kensico South Effluent Chamber of the Delaware Aqueduct. Conducted for the New York Board of Water Supply, New York, July 1978. (*)

8. Report of Hydraulic Tests on 1:5.333 Scale Model of the Modification to the Flow control System at Kensico. Conducted for the City of New York Board of Water Supply, October 1976. (James W. Ball, *, and W. J.Rahmeyer)

9. Progress Report of Hydraulic Tests on 1:5.333 Scale Model of the Modification to the Flow Control System at Kensico. Prepared for the City of New York Board of Water Supply, January 1976. (James W. Ball and *)

PUBLICATIONS (related to pumps and pumping pits)

Refereed Journal Publications

Modeling in Design of Pumping Pits. Journal of the Hydraulics Division, ASCE, Vol. 105, No. HY9, Proc. Paper 14812, September, 1979, pp. 1053-1063. (*)

Published in Conference Proceedings (* indicated authorship)

1. Selecting Controls for Water Distribution Systems. Presented at the International Conference on "Hydraulics of Pipelines", June 12-15, 1994, Phoenix, Arizona. (*)

2. Selection and Use of Control Devices in Water Distribution Networks. Presented at the International Conference on "Water Supply Systems State of the Art and Future Trends," October 13-19, 1992, Valencia, Spain. (*)

3. Criteria for Vortex Modeling. Proceedings of the ASCE Conference on "Advancements in Aerodynamics, Fluid Mechanics, and Hydraulics," June 3-6, 1986, Minneapolis, Minnesota. (Kent D. Galloway, Neal J. Campbell, Scott D. Lindsey, and *)

4. Investigation Into the Failures of Large Cooling Tower Lift Pumps. Proceedings of the Symposium on "Operating Problems of Pump Stations and Power Plants," Sept. 1982, Amsterdam. (Hamill Elder and *)

5. Basic Hydraulics for Pumps and Systems. Presented at ASCE Workshop "Pumps: Hydraulics, Characteristics and Selection," University of Central Florida, Orlando, Florida, June 1979. (*)

6. Role of Modeling in Design of Pumping Pits. Presented at the Short Course on Cooling Water Systems, Colorado State University, Ft. Collins, Colorado, June 1978. (*)

7. Role of Modeling in the Design of Pumping Pits. Presented at the American Society of Civil Engineers National Spring Convention and Continuing Education Program, Pittsburg, Pennsylvania, June 1978. (*)

Consulting Reports

1. Transient Analysis of Start-up Conditions for the Circulating Water Pumps at the D C Cook Nuclear Power Plant, Flowserve, Dec. 2001 (*).

2. Review of Singapore Pump Station for CH2MHill, Corvallis OR, Oct. 2000 Review of Design Methods and Pump Selection for Pressure Sewer Systems. Prepared for Environment One Corp., Jan. 2001 (*) .

3. Evaluation of Pumps and Valves at Ten Water Treatment Plants. Prepared for the Riverland Water District, Adelaide Australia, Nov. 2000 (*).

4. Analysis of cavitation and vibration problems for circulating water pumps and boiler feed pumps at Central Puerto Power plant, Buenos Aires, Argentina, May 2000 (*) .

5. Advantages and Disadvantages of Centrifugal Pumps and Environment/One Pumps for Use in Pressure Sewer Systems. Report Prepared for Environment/One Corporation, Schenectady, New York, December 1974 (*).

6. Design Recommendation for the Nuclear Pump Test Loop. Prepared for the Bingham Pump Company, May 1973. (*) Analysis of the Sodium Pump Flow Control Station. Prepared for Crane Company, January 1972 (*).

7. Analysis of the Bingham-Willamette Nuclear Pump Loop. Prepared for the Bingham-Willamette Company, July 1970. (*)

Model Study Reports, Utah State University

1. Model Study of Dunkirk Power Station. Conducted for Niagara Power Corp. Dec 1998. Blake P. Tullis and(*)

2. Amoco Decatur Model Study. Conducted for Ingersoll-Dresser Pump Co. March 1998. Blake P. Tullis and (*).

3. Model Study of Well Shafts for the Existing SNWA Lake Mead Pump Structure - IPS-1. Conducted for Black & Veatch. September 1996. (* and Steven L. Barfuss)

4. Model Study on Lake Mead Water Supply Intake Pumping Plant. Conducted for CH2M-Hill. February 1996. (*, Steven L. Barfuss, and Michael C. Johnson).

5. Intake Model Study for Taranaki Combined Cycle Plant. Conducted for Ingersoll-Dresser Pump Co. May 1997. (*)

6. Pumping Pit Model Study for Dalian. Conducted for Ingersoll-Dresser Pump Co. November 1996. (* and Steven L. Barfuss)

7. Pumping Pit Model Study for Dandong. Conducted for Ingersoll-Dresser Pump Co. November 1996. (* and Steven L. Barfuss)

8. Model Study on Lake Mead Water Supply Intake Pumping Plant. Conducted for CH2M-Hill. February 1996. (*, Steven L. Barfuss, and Michael C. Johnson).

9. Model Study of the Circulating Water Pump Intake for Arkansas Nuclear One Power Plant. Conducted for Ingersoll-Dresser Pumps. October 1994. (*, and Steven L. Barfuss)

10. Model Study of the Circulating Water Pump Intake for Cumberland Power Plant Units 1 & 2. Conducted for Ingersoll-Dresser Pumps. October, 1994 (*, and Steven L. Barfuss)

11. Model Study of the Circulating Water Pump Intake for Karachi Power Plant. Conducted for Ingersoll-Dresser Pumps. September 1994 (*, and Steven L. Barfuss)

12. Model Study of the Circulating Water Pump Intake for Rabigh Stage III Power Plant. Conducted for Ingersoll-Dresser Pumps. August 1994 (*, and Steven L. Barfuss)

13. Model Study of the Circulating Water Pump Intake for Hunter Power Plant. Conducted for Pacificorp Electric Operations, February 1994. (*)

14. Model Study of the Circulating Water Pump Intake for Suralaya Power Plant. Conducted for Ingersoll-Dresser, January 1994. (*)

15. Model Study of the Circulating Water Pump For Taiwan Power. Conducted for Ingersoll-Rand, September 1992. (*)

16. Model Study of Reservoir Water Pumps at Gerald Gentleman Station. Conducted for Nebraska Public Power District, October 1991. (*, William J. Rahmeyer and Steven L. Barfuss)

17. Model Study of the Circulating Water Pump Intake for Nova Scotia Power. Conducted for Ingersoll Rand, January 1991. (* and Steven L. Barfuss)

18. Model Study of the Intake for Taiwan Power Nuclear Power Station-Maanshan. Conducted for Ingersoll Rand, June 1990. (*, Steven L. Barfuss and Muin Baasiri)

19. Model Study of the Water Pump Pits at Nevada Power Check Station Combined Cycle Conversion Project. Conducted for Ingersoll Rand, April 1990. (Gilberto E. Urroz, and *)

20. Pumping Pit Model. Conducted for Ingersoll-Rand Company, September 1988. (*, Muin S. Baasiri, and Blake P. Tullis)

21. Model Study of the Circulating Water Pump Pits at Gerald Gentlemen Station. Conducted for Nebraska Public Power District, May 1986. (* and William J. Rahmeyer)

22. Model Study of Circulating Water Sumps at the Municipal Electric Plant, Wyandotte, Michigan. Conducted for Ingersoll-Rand Company, December 1984.(*)

23. The Model Study of the Circulating Water Sumps at the C. D. McIntosh Power Plant. Conducted for City of Lakeland, Florida, August 1984. (*)

24. Model Study for Bath County Pump-Turbine Project. Conducted for Harza Engineering Corp., April 1980. (* and Wm. Darrell South)

Model Study Reports, Colorado State University

1. Model Study of the Peach Bottom Nuclear Power Plant Cooling Water System. Conducted for Bechtel Corporation, February 1977 (*).

2. Model Study and Field Tests of Jim Bridger Circulating Pumps and Pumping Pits. Conducted for the Bechtel Power Corporation, San Francisco, California, March 1975 (*).

PUBLICATIONS (related to pipelines and flow meters)

Refereed Journal Publications

1. Coriolis Mass Flow Meter. Presented at National Engineering Laboratory Silver Jubilee Conference, Glasgow, Scotland, November 1979. (* and James Smith)

2. Predicting Cavitation in Sudden Enlargements. Journal of the Hydraulics Division, ASCE, Vol. 101, No. HY7, July, 1975, pp. 857-870. James W. Ball, *, and T. E. Stripling)

3. Turbulent Flow in the Entry Region of a Rough Pipe. Journal of Fluids Engineering, ASME, Paper No. 73-WA/FE-3, March, 1974, pp. 62-68. (J. S. Wang and *)

Journal Discussions

1. Fluctuations of Pressure in Conduit Expansions. Journal of the Hydraulics Division, ASCE, Vol. 93, No. HY3, 1967, pp. 197-201. (* and Maurice L. Albertson)

Published in Conference Proceedings

1. Selecting Controls for Water Distribution Systems. Presented at the International Conference on on "Hydraulics of Pipelines", June 12-15, 1994, Phoenix, Arizona. (*)

2. Selection and Use of Control Devices in Water Distribution Networks. Presented at the International Conference on "Water Supply Systems State of the Art and Future Trends," October 13-19, 1992, Valencia, Spain. (*)

3. Pipe Collapse Caused by a Pipe Rupture - A Case Study. Proceedings of the International Meeting on "Hydraulic Transients With Water Column Separation," September 4-6, 1991, Valencia, Spain. (*, and Reynold Watkins)

4. Drag Reduction and Roughness Build-up by TRO-375 Polyacrylamide Solution. Proceedings of the 2nd International Conference on Drag Reduction, British Hydraulics Research Association, England, August 31-September 2, 1977. Paper C3, pp. C3-21 to C3-26. (M. Poreh, *, and J. A. Hooper)

5. Drag Reduction in Developing Pipe Flow with Polymer Injection. Proceedings for the International Conference on Drag Reduction, British Hydraulics Research Association, Cambridge, England, September 4-6, 1974, Paper G3, pp. G3-31 to G3-41. (* and K. L. Va. Ramu)

6. Application on Cavitation Information for Design and Analysis of Closed Conduit Systems. Presented at the Institute on Control of Flow in Closed Conduits, Colorado State University, Fort Collins, Colorado, August 9-14, 1970. (*)

Unpublished Papers and Reports

1. Computer Modeling Multiple Arterial Stenoses. 1976. (*)

2. Multiple Arterial Stenosis: Effects on Flow and Post Stenotic Pressure. 1976. (*)

3. Polymer Injection for Drag Reduction. Naval Ship Research and Development Center Report, July 1972, 104 p. CER 72-73JPT-LFL-1. (* and Lance F. Lindeman)

4. Mean Turbulent Flow in the Entry Region of a Rough Pipe. Naval Ship Research and Development Center Report, July 1972, 126 p. CER72-73JPT- JSW2. (* and Jeng-Song Wang)

5. Design Recommendations for the Liquid Sulphur Transmission Line. Prepared for Stearns-Roger Corporation, January 1971. (*)

6. Recommended Modifications to the Cochrane Plant Water Intake Pipeline. Prepared for Stearns-Roger Corporation, March 1970. (*)

Reports, Utah State University (pipes)

1. Testing of Various Sizes of HDPE Pipe. Conducted for Advanced Drainage Systems, Inc. January 1997. (Steven L. Barfuss and *)

2. Manning's - N Test on Hiflow Storm Sewer Pipe. Conducted for Atlantic Industries Limited, October 1993. (Steven L. Barfuss, and *)

3. Project Report on the San Joaquin Pipeline. Conducted for Hetch Hetchy Water District, June 1993. (*)

4. Fielding Ditch Pipeline Computer Simulation Study. Conducted for the Soil Conservation Service, March 1981. (Calvin G. Clyde, *, and Roland W. Jeppson)

5. Friction Factor Tests on 36-inch Concrete Pipe. Conducted for American Iron and Steel Institute, April 1991. (*)

6. Friction Factor Tests on 24 and 48-inch Spiral Rib Pipe. Conducted for International Spiral Rib Pipe Association, April 1991. (*)

7. Friction Factor Test on 24-inch Helical Corrugated Pipe. Conducted for National Corrugated Steel Pipe Association, April 1991. (*)

8. Model Study of the Intake and Tunnel for the Muck Valley Hydro Project. Conducted for Malacha Hydro, June 1989. (*)

9. Friction Factor Tests on 12-inch High Density Polyethylene Pipe. Conducted for Big "O" Inc., March 1989. (Steven L. Barfuss and *)

10. Friction Factor Tests on 15-inch High Density Polyethylene Pipe. Conducted for Big "O" Inc., March 1989. (Steven L. Barfuss and *)

11. Friction Factor Tests on High Density Polethylene Pipe. Conducted for Big "O" Inc., February 1989. (*, and Steven L. Barfuss)

12. Friction Factor Tests on High Density Polethylene Pipe (18" diameter). Conducted for Big "O" Inc., February 1989. (*, and Steven L. Barfuss)

13. Friction Factor Tests on High Density Polyethylene Pipe. Conducted for Hancor, Inc., October 1988. (Steven L. Barfuss, and *)

14. Pipeline and Pumpstation Analysis. Conducted for Northglenn City, Colorado, May 1988. (*)

15. Friction Factor Tests on Concrete Pipe. Conducted for the American Concrete Pipe Association, Vienna, Virginia, October 1986. (*)

16. Manning's-n Test on Aluminum Spiral-Rib Pipe. Conducted for Kaiser Aluminum, Oakland, CA, July 1986. (*)

17. Model Study of the Y-Branch in Tunnel 3 at Tarbela Dam. Conducted for Tippetts-Abbett-McCarty-Stratton, June 1983. (* and Wm. Darrell South)

18. Friction Factor Tests on Spiral-Rib Pipe. Conducted for Pacific Corrugated Pipe Co., April 1983. (*)

19. Model Study of the Y-Branch in Tunnel 3 at Tarbela Dam. Conducted for TAMS Engineering, October 1981. (*)

Reports, Utah State University (flow meters)

1. Calibration of 1.5-inch and 2-inch Orifice Plates. Conducted for New York Power Authority, April 1992. (*)

2. The Laboratory Calibration of Two SX-24 19.25-inch x 10-inch Venturi Meters. Conducted for Henry Pratt Company, July 1991. (*)

3. Calibration of 2-inch Orifice Plates. Conducted for Consolidated Edison, May 1991. (*)

4. Calibration of Seven 2-inch Orifice Meters. Conducted for Commonwealth Edison, March 1991. (*)

5. Laboratory Calibration of an 18-inch Venturi Meter. Conducted for Henry Pratt Company, January 1991. (* and Steven L. Barfuss)

6. Laboratory Calibration of a 24-inch and 30-inch Venturi Meter. Conducted for Henry Pratt Company, July 1990. (*, Steven L. Barfuss and Blake P. Tullis)

7. Laboratory Calibration of a 48-inch and 36-inch Venturi Meter. Conducted for Gerand Engineering Co., June 1990. (Steven L. Barfuss and *)

8. Laboratory Calibration of a 10-inch Flow Nozzle. Conducted for Ogden Martin Systems, November 1989. (Steven L. Barfuss and *)

9. Laboratory Calibration of Two Portable Ultrasonic Meters. Conducted for Bonneville Power Administration, October 1989. (Steven L. Barfuss, * and Blake P. Tullis)

10. Calibration of an 8-inch Venturi and 8-inch V-cone Meter. Conducted for McCrometer, October 1989. (Steven L. Barfuss, *, and Blake P. Tullis)

11. Calibration of Lithium Tracer Flow Measurement Technique. Conducted for Combustion Engineering, September 1989. (*)

12. Calibration of a 10-inch Henry Pratt Venturi Meter. Conducted for Henry Pratt Company, August 1989. (*, and Steven L. Barfuss)

13. Calibration of a 12-inch Pratt Flow Tube. Conducted for Henry Pratt Company, July 1989. (*)

14. Calibration of 16 Orifice Assemblies. Conducted for Westinghouse Electric Corp., June 1989 (*, and Steven L. Barfuss)

15. Calibration of Flow Metering Installation at Streamwood Booster Pumping Station. Conducted for Northwest Suburban Municipal, March 1989. (*, and Steven L. Barfuss)

16. Laboratory Calibration of a 20" Differential Pressure Flow Meter. Conducted for McCrometer, March 1989. (Steven L. Barfuss and *)

17. Venturi Meter Calibrations. Conducted for Gerand Engineering Company, May 1988. (Steven L. Barfuss, and *)

18. Velocity Probe Calibration. Conducted for Southern Company Services, May 1988. (*)

19. Magnetic Flow Meter Calibration. Conducted for Turbo Instruments, Inc., May 1988. (Steven L. Barfuss, Kelvin Anderson, and *)

20. Flumeter Calibrations. Conducted for Yellowstone Environmental Science, April 1988. (* and Kelvin Anderson)

21. Turbine Flowmeter Calibration. Conducted for Hoffer Flow Controls, December, 1987. (*)

22. Orifice Calibrations. Conducted for Naval Engineering Works, December 1987. (*)

23. Report on Calibration of 12" Turbine Flow Meters. Conducted for Hoffer Flow Control, Port Monmouth, NJ, March 1987. (*)

24. Calibration of a D-150 Micro-Motion Mass Flow Meter. Conducted for MicroMotions Inc., October 1984. (*)

25. Calibration of a 4" Ultrasonic Flow Meter. Conducted for Manning Environmental, September 1981. (*)

26. Calibration of a 14" Fluid Kinetics Sonic Meter. Conducted for Manning Environmental, August 1981. (*)

27. Calibration of a 4" Fluid Kinetics Sonic Meter. Conducted for Manning Environmental, August 1981. (*)

28. Calibration of 4-Inch Annubars. Conducted for El Paso Algeria Corp. and Dieterich Standard, November 1980. (*)

29. Calibration of Micro Motion Mass Flow Meters. Conducted for Micro Motion Inc., February 1979. (*)

30. Calibration Tests on Xomox 16-Inch Equal and Unequal Venturis. Conducted for Xomox Corporation, January 1979. (*)

31. Discharge Calibration of a 24-Inch Parshall Flume with Surface Skimmer. Conducted for the Division of Water Resources, April 1978. (*)

Reports, Colorado State University (pipes)

1. Polymer Injection into a Boundary Layer. Conducted for the Naval Ship Research and Development Center, March 1976. (*, Michael Poreh and John A. Hooper)

2. Viscous Drag Reduction in Developing Pipe Flow. Conducted for the Naval Ship Research and Development Center, November 1973. (* and Kikkeri L.V. Ramu)

3. Line Loss and Rupture Tests of Nylon Tubing. Conducted for Carlisle Tire and Rubber Division, Carlisle Corporation, April 1973. (*)