

BIOGRAPHICAL SKETCH

*Dr. Steven J. Duranceau, P.E., Associate Professor
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Dr. Steven J. Duranceau is Associate Professor of Environmental Engineering in the Civil, Environmental and Construction Engineering Department (CECE) at the University of Central Florida (UCF), in Orlando, Florida. Dr. Duranceau's research focuses on advanced water treatment processes, treatment performance, mass transfer investigations, distribution system water quality, cost, and corrosion control evaluations. He currently serves on the editorial board for *Desalination*, and is Associate Editor of *Desalination and Water Treatment*. He previously served on the editorial advisory board for the *Journal American Water Works Association* from 2001 to 2008. He has been appointed to the Research Advisory Board of the National Water Research Institute [2006-present].

Dr. Duranceau is President (2008-2009) of the American Membrane Technologies Association (AMTA), after serving as 1st Vice President (2007-2008) and has been a member of the Board of Directors from 2004-2006. He is one of the founding members of the Southeast Desalting Association (SEDA) and Southwest Membrane Operators Association (SWMOA), and is past chair of American Water Works Association's (AWWA's) Desalting, Membrane Processes and Inorganic Contaminants Committees. He is a past Trustee for the Florida Section AWWA, and was chair of AWWA's 1995 and 1997 Membrane Technologies Conferences.

Dr. Duranceau has close to 20 years of water treatment and distribution system design engineering experience, having performed bench-pilot studies, design, permitting and construction observation activities for many water communities, research organizations and government agencies. He has worked on projects funded by a number of U.S. city and county governments, the U.S. EPA, U.S. Navy, and the Water Research Foundation (formerly AwwaRF). He has served as peer reviewer for U.S. EPA's Equipment Technologies Verification (ETV) program (2002-2008) for modular water treatment systems per a contract with NSF International. He has served as a peer reviewer (2008) for the American Academy for the Advancement of Science (AAAS) with regards to the desalination component of the Kingdom of Saudi Arabia's Long Term Comprehensive National Plan for Science, Technology and Innovation (KARST) initiative.

Dr. Duranceau is a registered professional engineer in the state of Florida, and is certified as a chemical engineer with the American Institute of Chemists, Inc. Dr. Duranceau serves as an adjunct instructor at the University of Wisconsin-Madison for the Department of Engineering for their Professional Development Program and provided instruction in several workshops on retrofitting and optimizing the operation of drinking water facilities. He has instructed at the university level in theoretical chemistry, process engineering, laboratory procedures, and environmental engineering coursework. He is a graduate of Florida State University, with a Bachelor's degree in Chemistry, and of the University of Central Florida with a Masters degree in Industrial Chemistry and a Doctorate in Environmental Engineering. Dr. Duranceau has produced 19 peer-review publications since 1986, and has participated in the development of over a dozen books and government documents. He has presented over 145 times and published over 100 articles in proceedings of conferences and symposiums that focus on drinking water quality, treatment and distribution topics.

EDUCATION

Doctor of Philosophy (Ph.D.)

Environmental Engineering; University of Central Florida, Orlando, Florida [1990]

Dissertation Title: *Modeling of Mass Transfer and Synthetic Organic Compound Removal in a Membrane Softening Process.*

Advisor: Dr. James S. Taylor, P.E.

Masters of Science (M.S.)

Industrial Chemistry; University of Central Florida, Orlando, Florida [1987]

Thesis Title: *The Reaction of 2-Arylprop-1-en-3-yltrimethyl Ammonium Iodides with Sulfur Nucleophiles and Useful Synthetic Applications of These Adducts.*

Advisor: Dr. John T. Gupton

Bachelor of Science (B.S.)

Chemistry [American Chemical Society] Florida State University, Tallahassee, Florida [1983]

Associate of Arts (A.A.)

Manatee Junior College, Bradenton, Florida [1981]

Also Attended: U.S. Naval Academy, Annapolis, MD; University of Georgia, Athens, GA.

EXPERIENCE

July 2007 – Present	Associate Professor Director, Environmental Systems Engineering Institute University of Central Florida, Orlando, Florida
October 2006 – July 2007	President Duranceau Consulting Services, LLC, Orlando, Florida
October 1992 – Sept. 2006	Vice-President National Director, Water Quality & Treatment Boyle Engineering Corporation, Orlando, Florida
Sept. 1990 – Sept. 1992	Associate Engineer Howard Needles Tammen & Bergendoff, Orlando, Florida
August 1987 – August 1990	Graduate Research Assistant College of Engineering, Civil and Environmental Engineering University of Central Florida, Orlando, Florida
August 1985 – August 1987	Graduate Teaching Assistant University of Central Florida Department of Chemistry College of Arts and Sciences, Orlando, Florida
May 1984 – August 1985	Chemist I, Food Laboratory Florida Department of Agriculture and Consumer Services Tallahassee, Florida
August 1980	Honorable Discharge, United States Navy [Midshipman]

PROFESSIONAL ACTIVITIES

- Associate Editor, *Water Treatment and Desalination*. [2008-present].
- Editorial Board Member, *Desalination*. [2002-present].
- Editorial Advisory Board Member, *Journal American Water Works Assoc.* [2001-2008]
- President, American Membrane Technology Association [2008-2009]; Member, Board of Directors [2002-2008]; Chair of AMTA's Annual Conferences in 2006 and 2007.
- National Water Research Institute (NWRI), Research Advisory Board [2006-present].
- American Water Works Association (AWWA); past Chair of the Water Resources Division's Desalting Committee; past Chair of the Water Quality Division's Membrane Processes and Inorganic Contaminants Committees; Chair of AWWA's 1995 and 1997 Membrane Technologies Conferences; Member [1988 – present].
- Project Advisory Committee; Awwa Research Foundation (Water Research Foundation).
 - *Development of a Microfiltration and Ultrafiltration Knowledge Base*
 - *A Novel Approach to Seawater Desalination Using Dual-Stage Nanofiltration*
 - *Comparing Nanofiltration and Reverse Osmosis for Treating Recycled Water*
 - *Development and Validation of ICR Membrane Protocol for Bench/Pilot Studies*
 - *Flat Sheet, Bench & Pilot Testing for Pesticide Removal Using Reverse Osmosis*
- Florida Section AWWA. Past Section Trustee-at-Large [1994-2001], Secretary of Technical and Education Council [1991-1993], Chair-Research Committee [2007-2008].
- Southeast Desalting Association (SEDA); Founding member, Board of Directors [1998-2004]; Chair of SEDA Annual Seminars 1998-2002, member [1998 – present].
- Southwest Membrane Operator's Association (SWMOA). Founding member; Board of Directors [2007-present].
- International Desalination Association (IDA); member [2000-present].
- Orange County Florida Development Advisory Board Member-Appointee [1991-1995].
- American Chemical Society (ACS); member [1982-present].
- Alpha Chi Sigma; member [1982-present]
- American Institute of Chemists, Inc. (AIC); member [1996-present].
- Circle K International, Member [1979-1981], Lt. Governor [1980-1981].
- Technical Peer Reviewer for the following [1992-present];
 - *American Academy for the Advancement of Science KARST Reviews [Saudi Arabia]*
 - *Water Treatment and Desalination;*
 - *Desalination*
 - *Journal American Water Works Association*
 - *Journal Environmental Science and Technology*
 - *Journal Water Research and Technology*
 - *Journal American Society of Civil Engineers, Environmental Engineering*

HONORS, AWARDS and CERTIFICATIONS

- 2008 Best Paper, Florida Section – American Water Works Association’s Fall 2008 Conference, “*Desalination Post-Treatment Considerations*,” Orlando, FL (Dec. 3, 2008).
- 2008 Presidential Award, American Membrane Technology Association, “*In recognition of his untiring effort supporting the growth and development of AMTA through his service as Annual Conference chair and the furtherance of AMTA’s mission to increase the understanding and use of advanced water treatment technologies to improve America’s water supplies*,” Naples, FL (July 15, 2008).
- 2008 Certificate of Appreciation, AWWA, “*For Service to the Association and the Industry as Chair of the Water Desalting Committee*,” Atlanta, GA (June 16, 2008).
- 2007 Best Paper, 2007 AMTA Annual Conference and Exhibition. “*Membrane Forensics and Troubleshooting Membrane Facilities*.” Anaheim, CA (August 2, 2006).
- 2006 Presidential Award, American Membrane Technology Association, “*In recognition of his service to AMTA*,” Anaheim, CA (July 21, 2006).
- 2006 - 2003 Certified Chemical Engineer, by the National Certification Commission in Chemistry and Chemical Engineering, sponsored by the American Institute of Chemists, Inc., Philadelphia, PA (June 29, 2003 thru June 30, 2006).
- 2004 Distinguished Service Award, Southeast Desalting Association, “*In recognition of his contribution to the growth and development of the Southeast Desalting Association*,” Stuart, FL (June 29, 2004).
- 2002 RAM Certification, American Water Works Association certified *Risk Assessment Methodology for Water Surety (RAM-WSM)*, licensed by Awwa Research Foundation and Sandia National Laboratories, Atlanta, GA (July 15-17, 2002).
- Distinguished Service Awards, Florida Section AWWA: 2001; 1998; 1995.
- 1999 Certificate of Appreciation, Olivenhain Municipal Water District: “*In recognition of his commitment to the membrane evaluation panel for Olivenhain’s 25 million gallon per day ultrafiltration water treatment plant*,” (Encinitas, CA; April 1999).
- 1988 Roy W. Lykins Scholarship, Florida Section AWWA (Inaugural recipient).
- 1994 Professional Engineering License, State of Florida (No. 46583; 1994-present).

PATENTS

- U.S. Patent 7081205. *Mobile Desalination Plants and Systems, and Methods for Producing Desalinated Water*. Inventors: A.W. Gordon; CR Cushing; SJ Duranceau; JM Cavanaugh. Assignee: Water Standard Company, L.L.C. Filed 7/30/03 (Issued: 7/25/06).
- South African Patent 03684. *Mobile Desalination Plants and Systems, and Methods for Producing Desalinated Water*. Inventors: A.W. Gordon; C.R. Cushing; S.J. Duranceau; J.M. Cavanaugh. Assignee: Water Standard Company, L.L.C., September 6, 2005.
- Canadian Patent 2,501,413. *Mobile Desalination Plants and Systems, and Methods for Producing Desalinated Water*. Inventors: A.W. Gordon; C.R. Cushing; S.J. Duranceau; J.M. Cavanaugh. Assignee: Water Standard Company, L.L.C.; August 25, 2005.

KEYNOTE ADDRESSES

- Innovation in Water Technologies for Preparedness, Security and Longevity, Honolulu, Hawaii, May 10-12, 2006, Hawaii Section AWWA, in Closing General Session and presented “*Upcountry Maui Corrosion Control: Scratching out a Solution.*”
- Membrane Technology Conference, Royal Society of Chemistry (RSC) and European Desalination Society (EDS), Lancaster, England, March 26-29, 2000. Keynote speaker for first United Kingdom international conference on membranes. Presented “*Membrane Case Studies: Past, Present Future*” to members of the RSC and EDS.
- Conference on Membranes in Drinking and Industrial Water Production, Amsterdam, Netherlands, September 21-24, 1998. Keynote speaker for the international conference on membranes in conjunction with AquaTech98. Presented “*The Role of Membranes in Drinking Water Production in the United States*” to members of the International Water Services Association, the European Desalting Association, and the AWWA.

EXPERT WORKSHOPS

- Water Research Foundation (formerly AwwaRF) Expert Workshops. Orlando, FL May 21-23, 2008; Irvine, CA, February 9, 2009 and Los Angeles, February 10, 2009; Post-Treatment Stabilization of Desalinated Water.
- WateReuse Foundation Research Needs Workshop, San Diego, CA, February 2-4, 2004. Participated in expert workshop and breakout groups to develop and prioritize research agenda for the WateReuse Foundation. Prioritized research needs related to water reuse and desalination. Assisted in the development of 50 research topics.
- Department of the Navy and Bureau of Reclamation Water Desalination Workshop, Crystal City, VA, May 6-7, 2003. Expert panelist on a US Government workshop sponsored by the U.S. Department of the Navy and the U.S. Bureau of Reclamation. Provided testimony on state-of-the-art filtration technologies.
- AwwaRF/USBR Membrane Workshop, Golden, CO, July 27-28, 2000. Participated in an expert workshop sponsored by the U.S. Bureau of Reclamation and the Awwa Research Foundation. Twenty-nine professionals from six nations representing manufacturing, government, academics, and consulting participated in this workshop.
- Intelligent Pipe and Meter Workshop, July 13 & 14, 1998. Participated in an expert workshop sponsored by the Awwa Research Foundation. Over 20 professionals from the manufacturing, academics, and consulting participated in this workshop. Assisted in the production of a workshop report that identified the most important research needs related to distribution mains, pipelines, and meters in the drinking water community.
- Non-Potable Water Reuse Workshop, Pomona, CA, July 23-25, 1999. Participated in an expert workshop that was sponsored by the National Water Research Institute. Over thirty professionals participated in this workshop that employed the Nominal Group Technique that focused on water reuse and quality issues.
- Membrane Processes for Drinking Water Treatment, Bar Harbor, Maine, June 8-9, 1995. Participated in an expert workshop sponsored by the AWWA Research Foundation. Over 30 professionals from manufacturing, academics, and consulting participated.

PUBLICATIONS

Book and Document Publications

1. **Duranceau**, S.J and J.S Taylor, “Membrane Processes” in Water Quality and Treatment, 6th Edition. Ed. J. K. Edzwald. New York: McGraw-Hill [in process – Fall 2009 publication schedule].
2. **Duranceau, S.J.**, D. Townley and G.E.C. Bell. Optimizing Corrosion Control in Water Distribution Systems. Denver, CO: Awwa Research Foundation and AWWA (2004).
3. Rommelmann, D., S.J. **Duranceau** et.al. Industrial Water Quality Requirements for Reclaimed Water. Denver, CO: Awwa Research Foundation and AWWA (2004).
4. Romer, A.E., G.E.C. Bell, S.J. **Duranceau** and S. Forman. External Corrosion Control for Buried Water Mains. Denver, CO: Awwa Research Foundation and AWWA (2004).
5. Ellison, D., with S.J. **Duranceau** et. al. Investigation of Pipe Cleaning Methods. Denver, CO: Awwa Research Foundation and American Water Works Association (2003).
6. **Duranceau**, S.J. Membrane Practices for Water Treatment. AWWA Trends in Water Series. Denver, CO: AWWA (2001).
7. Taylor, J.S. and S.J. **Duranceau** in Membrane Technology in Water and Wastewater Treatment. “*Membrane Case Studies, Past, Present, Future.*” Edited by P. Hillis. London: Royal Society of Chemistry (2000).
8. **Duranceau**, S.J., J.V. Foster, J. Poole. Impact of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality. Denver, CO: American Water Works Association (1998).
9. **Duranceau**, S.J.; G.E.C. Bell; and M.J. Schiff. Effects of Electrical Grounding on Pipe Integrity and Shock Hazard. Denver, CO: American Water Works Association (1996).
10. Whiting, D.D., et. al. with S.J. **Duranceau** (technical advisory committee). Protocols for Determining Major-Seawater-Ion Toxicity in Membrane Technology Water Treatment Concentrate. Tallahassee, FL: Florida DEP Bureau of Laboratories, 12/28/95 (1995).
11. Taylor, J.S., C.R. Reiss, P.S. Jones, K.E. Morris, T.L. Lyn, D.K. Smith, L.A. Mulford, and S.J. **Duranceau**. Reduction of Disinfection By-Product Precursors by Nanofiltration. EPA/600/SR-92/023. Cincinnati, OH: USEPA-RREL, April (1992).
12. **Duranceau**, S.J. Modeling of Mass Transfer and Synthetic Organic Compound Removal in a Membrane Softening Process. Doctorate Dissertation, University of Central Florida, Orlando (1990).
13. Taylor, J.S., S.J. **Duranceau**, L.A. Mulford, D.K. Smith, and W.M. Barrett. Synthetic Organic Compound Rejection by Nanofiltration. EPA/600/S2-89/023. Cincinnati, OH: USEPA-RREL., January (1990).

14. Taylor, J.S., L.A. Mulford, W.M. Barrett, S.J. **Duranceau**, and D.K. Smith. Cost and Performance of Membranes for Organic Control in Small Systems: Flagler Beach and Punta Gorda, FL. EPA/600/S-2/89/022. Cincinnati, OH: USEPA-RREL, January (1990).
15. Taylor, J.S., S.J. **Duranceau**, W.M. Barrett, and J.F. Goigel. Assessment of Potable Water Membrane Applications and Research Needs. Denver, CO: AWWA Research Foundation, December (1989).

Refereed Journal Publications (National and International)

1. **Duranceau**, S.J. "Modeling the Permeate Transient Response to Perturbations from Steady-State in a Nanofiltration Process." Desalination and Water Treatment. Volume 1; pp. 7-16 (2009).
2. Gilreath, J.P., B.M. Santos and S.J. **Duranceau**. *Seasonal Variation of Paraquat Photodegradation Rate on Polyethylene Mulch*. Weed Technology. Vol. 20:315-318 (2006).
3. Lovins, W.A.; S.J. **Duranceau**, R.M. Gonzalez and J.S. Taylor. "Optimized Coagulation Assessment for a Highly Organic Surface Water Supply." Journal American Water Works Association (AWWA). 95(10): 99-108 (2003).
4. Bell, G.E.C. and S.J. **Duranceau**. "Effects of Electrical Grounding and Electrical Properties on Water Quality." Journal AWWA. 94(5), 113-125 (2002).
5. Townley, D. W., S.J. **Duranceau**, and D. F. Wilson. "On-Line Electrochemical Noise Monitoring in Potable Water Distribution Systems." Corrosion 2002, Paper 02328. Houston, TX: NACE International, Inc. (2002).
6. **Duranceau**, S.J. "Dawning of a New Age." Journal AWWA, 93(4):122-24(2001).
7. Townley, D. and S.J. **Duranceau**. "Instrumentation Considerations for Electrochemical Noise Corrosion Monitoring in the Field." Corrosion 2001, Paper 01287. Houston, TX: NACE International, Inc. (2001).
8. **Duranceau**, S.J. "Membrane Replacement in Desalting Facilities." Desalination, L'Aquila, Italy, Vol. 132, pp. 243-248 (2000).
9. **Duranceau**, S.J. "The Future of Membranes." Journal AWWA, 92(2), 70(2000).
10. **Duranceau**, S.J. J. Foster, J. Poole. "Wet-Pipe Fire Sprinkler Systems and Drinking Water Quality." Journal AWWA, 91 (7), 78-86 (1999).
11. **Duranceau**, S.J., R.K. Anderson, R.D. Teegarden. "Comparison of Mineral Acid Pretreatments for Hydrogen Sulfide Removal in Packed Towers." Journal AWWA, 91 (5), 85-96 (1999).
12. **Duranceau**, S.J., M.J. Schiff, G.E.C. Bell. "Electrical Grounding, Pipe Integrity, and Shock Hazard." Journal AWWA. 90(7), 40-52 (1998).

13. Bell, G.E.C., M.J. Schiff and **S.J. Duranceau**. "Review of the Effects of Electrical Grounding on Water Piping." Corrosion 95, Paper 603. Houston, TX: NACE International, Inc. (1995)
14. Taylor, J.S., J.A.M.H. Hofman, S.J. **Duranceau**, J.C. Kruithof, and J.C. Schippers. "Simplified Modeling of Diffusion Controlled Membrane Systems." Aqua-Journal Water Supply and Research, 43(5) 238-245 (1994).
15. **Duranceau**, S.J., J.S. Taylor, and L.A. Mulford. "SOC Removal in a Membrane Softening Process." Journal AWWA, 84 (1), 68-78 (1992).
16. Gupton, J.T., D.A. Krolikowski, R.H. Yu, K.J. Barr, and S.J. **Duranceau**. "New Reactions of Quaternary Ammonium Salts Derived from Vinamidinium Salt Reduction Products and a Reassignment of Structure." Synthetic Communications. 22 (7), 1067-1076 (1992).
17. Taylor, J.S., L.A. Mulford, S.J. **Duranceau**, W.M. Barrett. "Cost and Performance of a Membrane Pilot Plant." Journal AWWA. 81 (11), 52-60 (1990).
18. Gupton, J.T., S.J. **Duranceau**, J.F. Miller, M.L. Kosiba. "The reaction of alpha-Methylstyrene Analogs & Related Compounds with Sodium Perborate in Acetic Acid." Synthetic Communications. 18 (9), 937-942 (1988).
19. Gilreath, J.P., and S.J. **Duranceau**. "Photodegradation of Paraquat Applied to Polyethylene Film Mulch." HortScience. 21 (5), 1145-1148 (1986).

Journal Publications (Regional) – Non-Refereed

1. Lovins, W.A.; S.J. **Duranceau**, R. Powell and J.R. Voorhees. "Experiences with Blending Multiple Source Waters into a Common Distribution System." Florida Water Resources Journal. 57(3): 31-35 (2005).
2. **Duranceau**, S.J. and L.R. Henthorne. "Membrane Pretreatment for Seawater Reverse Osmosis Desalination." Florida Water Resources Journal. 56(11): 33-37 (2004).
3. Lovins, W.A.; S.J. **Duranceau**, T. King and S. Medeiros. "Trumping Hydrogen Sulfide." Water Environment & Technology. 16(3): 37-41 (2004)
4. Lovins, W.A.; S.J. **Duranceau**, R.M. Gonzalez and J.S. Taylor. "Optimization of the Peace River/Manasota Conventional Coagulation Water Supply Facility." Florida Water Resources Journal. 54(11), 20-27 (2002).
5. **Duranceau**, S.J., et. al. "Comparison of Hollow-Fiber and Spiral-Wound Technologies on a Brackish Ground Water." Florida Water Resources Journal, 52 (1), 26-33 (2000).
6. **Duranceau**, S.J., et. al. "Interstage Turbine: Innovative Use for Energy Recovery and Enhanced Water Production at a Membrane Desalting Facility." International Desalination & Water Reuse Quarterly, 8(4), 34-40 (1999).

7. **Duranceau, S.J.**, et. al. “*Grounding Can Affect Water Quality.*” Florida Water Resources Journal, 49(2), 34-46 (1997).
8. **Duranceau, S.J.** “*Mathematics for Membrane Processes.*” Florida Water Resources Journal. 46(9), 26-28 (1994).
9. **Duranceau, S.J.**, and E. Melear. “*Balancing Multiple Water Quality Requirements of the Safe Drinking Water Act.*” Florida Water Resources Journal. 46(7), 22-25 (1994).
10. **Duranceau, S.J.**, et. al. “*It’s a Sinh, Problem No. 158.*” The Two-Year College Mathematics Journal. Washington, D.C.: The Mathematical Association of America. 12(3), 215-216 (1981).

Proceedings and Papers Publications

1. **Duranceau, S.J.** “*Desalination Post-Treatment Considerations.*” Florida Section American Water Works Association Fall 2008 Conference, Renaissance Orlando Resort at Seaworld, Orlando, FL (November 30 – December 3, 2008). **Received Best Paper Award.**
2. Lovins, W.A.; **Duranceau, S.J.**; Weiss, R; Vargas, J. “*Chemical Pretreatment Optimization for NF and RO Processes: Pilot and Full-Scale Experiences.*” 2008 Joint Conference and Exposition Membrane Week. American Membrane Technology Association and Southeast Desalting Association: Naples, Florida (July 14-17, 2008).
3. **Duranceau, S.J.** “*Considerations for Blending Permeate into Water Distribution Systems.*” 2008 Joint American Membrane Technology Association and Southeast Desalting Association Conference and Exposition Membrane Week. Naples Grand Resort and Club, Naples, Florida (July 13-16, 2008).
4. **Duranceau, S.J.** “*Industry Advancements: Membranes, Pressure Vessels and Floating Seawater Desalting Facilities.*” 2008 Joint American Membrane Technology Association and Southeast Desalting Association Conference and Exposition Membrane Week. Naples Grand Resort and Club, Naples, Florida (July 13-16, 2008).
5. **Duranceau, S.J.** “*Stabilization of Desalted Water Supplies*” Proceedings of the 2008 AWWA Annual Conference and Exhibition. Atlanta, Georgia (June 8-12, 2008).
6. **Duranceau, S.J.** “*Membrane Filtration Systems; Adsorption; Ion-Exchange; Aeration.*” Fundamentals of Drinking Water Treatment. College of Engineering Department of Engineering and Professional Development. University of Wisconsin. Madison; at US Bureau of Reclamation’s Bismark, ND (September 18 – 19, 2007).
7. **Duranceau, S.J.** “*Membrane Autopsies.*” American Membrane Technology Association Technology Transfer Workshop, (December 12-13, 2007); Honolulu, Hawaii.
8. Lovins, W.A., R.M. Powell and S.J. **Duranceau.** “*Measuring the Life Cycle Cost of Chloramines.*” Proceedings of the 2007 AWWA Water Quality Technology Conference, Charlotte, North Carolina (November 7-10, 2007).

9. **Duranceau, S.J.** “*Use of Membrane Forensics for Solving Operational Problems in Desalting Facilities.*” Proceedings of World Congress on Desalination and Water Reuse – Desalination: Quenching a Thirst. Palacio de Congresos de Maspalomas, Gran Canaria, Spain (October 21-26, 2007)
10. Brown, D; P. Jursack; M. Cantor; I.C. Watson; C. Harris; **S.J. Duranceau**; G. Hart. “*Pilot Testing the Center Port Vessel Design, Town of Jupiter, FL.*” Proceedings of 2007 American Membrane Technology Conference and Exposition, (July 23-26, 2007); Las Vegas, Nevada.
11. **Duranceau, S.J.** “*Membrane Forensics and Its Value to Membrane Water Plants.*” AWWA Membrane Technology Conference & Exposition. Tampa, FL (March 18-21, 2007).
12. **Duranceau, S.J.** “*Technical Interactions with Customers Experiencing Plumbing Corrosion.*” Florida Section AWWA 2006 Annual Conference. Renaissance Orlando Resort at SeaWorld, Orlando, FL: (November 26-30, 2006).
13. **Duranceau, S.J.**, W.A. Lovins, S. Guevara, B. Erickson, S. Messner. “*Evaluation of Interstage Turbines for North Collier’s Reverse Osmosis Process.*” Florida Section AWWA 2006 Annual Conference. Renaissance Orlando Resort at SeaWorld, Orlando, FL: (November 26-30, 2006).
14. Lovins, W, S.J. **Duranceau**, S. Guevara, R. Powell. “*Measuring the Benefit of Periodic Conversion to Free Chlorine in Chloraminated Systems.*” Florida Section AWWA 2006 Annual Conference. Renaissance Orlando Resort at SeaWorld, Orlando, FL: (November 26-30, 2006).
15. **Duranceau, S.J.** “*Membrane Forensics and Troubleshooting Membrane Facilities.*” Proceedings of the AMTA 2006 Biennial Conference and Exposition. Anaheim, CA: (July 31 – August 2, 2006). *Note: This paper was selected as best paper at the AMTA conference.*
16. **Duranceau, S.J.** “*Post Treatment and Distribution System Impacts.*” Proceedings of the AWWA 2006 Desalination Symposium. Honolulu, HI: (May 7-9, 2006).
17. **Duranceau, S.J.** and S. Guevara. “*Chloramine and Coliform: Should You Be Concerned?*” Proceedings of the 81st Annual Florida Water Resources Conference. Orlando, FL: FS/AWWA, FWEA and FWPCOA. (April 9-12, 2006).
18. **Duranceau, S.J.**, W.A. Lovins and S. Guevara. “*Comparison of Bleach and Mixed Oxidants*” Proceedings of the 81st Annual Florida Water Resources Conference. Orlando, FL: FS/AWWA, FWEA and FWPCOA. (April 9-12, 2006).
19. Lovins, W.A. and S.J. **Duranceau**. “*Aerobic Membrane Feedwater Conditions: Friend or Foe?*” Proceedings of the 81st Annual Florida Water Resources Conference. Orlando, FL: FS/AWWA, FWEA and FWPCOA. (April 9-12, 2006).
20. Plavcan, D., S.J. **Duranceau**, T. King and V. Ahkimie. “*Tendon Tank Resolves Site, Schedule and Budget Concerns in Florida.*” Proceedings of the 81st Annual Florida Water

- Resources Conference. Orlando, FL: FS/AWWA, FWEA, FWPCOA. (April 9-12, 2006).
21. **Duranceau, S.J.** “*Pitting of Copper Pipe – Are Utilities Responsible?*” Proceedings of the 2005 Florida Section AWWA 2005 Conference. Orlando, FL: AWWA (November 27 – December 1, 2005).
 22. Plavcan, D., S.J. **Duranceau**, T. King and V. Ahkimie. “*AWWA D-115 Tank Resolves Problems in Florida.*” Proceedings of the 2005 Florida Section AWWA 2005 Conference. Orlando, FL: AWWA (November 27 – December 1, 2005).
 23. King, T., V. Ahkimie, S.J. **Duranceau**, S.J. and D. Plavcan. “*Oviedo’s New Water Treatment Facilities: Designed for the Future and Built for Success.*” Proceedings of the 2005 Florida Section AWWA 2005 Conference. Orlando, FL: AWWA (November 27 – December 1, 2005).
 24. **Duranceau**, S.J. and W.A. Lovins. “*Membrane Post Treatment Optimization for Blending Permeate Into Water Distribution Systems.*” Proceedings of the 2005 AWWA Distribution System Symposium Conference and Exposition. Tampa, FL: AWWA (Sept. 18-21, 2005).
 25. Lovins, W.A., S.J. **Duranceau**, S. Guevara and R. Powell. “*Evaluation of Corrosion Inhibitors for a Distribution System Receiving Variable Surface, Ground and Desalted Water Blends.*” Proceedings of the 2005 AWWA Distribution System Symposium Conference and Exposition. Tampa, FL: AWWA (September 18-21, 2005).
 26. **Duranceau**, S.J. and S. Guevara “*Membrane Biofouling: Causes and Solutions.*” Proceedings of the AWWA 2005 Conference and Exposition. San Francisco, CA: AWWA (June 12-16, 2005).
 27. **Duranceau**, S.J. “*Chloramine and Internal Corrosion: Is There A Connection?*” Proceedings of the 80th Annual Florida Water Resources Conference. Jacksonville, FL: FS/AWWA, FWEA and FWPCOA. (April 24-27, 2005).
 28. Lovins, W.A., S.J. **Duranceau**, R. Powell and J.R. Voorhees. “*Blending Multiple Source Waters in a Common Water Distribution System.*” Proceedings of the Florida Section AWWA 2004 Annual Conference. Orlando, FL (November 14-18, 2004).
 29. **Duranceau**, S.J. “*Effects of Electrical Grounding on Pipe Integrity, Shock Hazard and Water Quality.*” Proceedings of the Florida Section AWWA 2004 Annual Conference. Orlando, FL (November 14-18, 2004).
 30. **Duranceau**, S.J., W.A. Lovins and S. Guevara. “*You Can’t Hide From Hydrogen Sulfide.*” Proceedings of the Florida Section AWWA 2004 Annual Conference. Orlando, FL (November 14-18, 2004).
 31. **Duranceau**, S.J. “*Post Treatment Considerations for Blending Permeate into Water in to Water Distribution Systems.*” Proceedings of the 2004 AMTA Biennial Conference and Exposition. San Antonio, TX: AMTA: (August 4-August 7, 2004).

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PRESENTATIONS

1. "Desalination Post-Treatment Considerations." Florida Section American Water Works Association Fall 2008 Conference, Renaissance Orlando Resort at Seaworld, Orlando, FL (November 30 – December 3, 2008).
2. "Drinking Water Quality & Treatment: Nanoscience Opportunities?" Presentation to the UCF NanoScience Technology Center, Orlando, FL (November 12, 2008).
3. "Stabilization of RO Treated Water." Hawaii Water Works Association Conference 2008: Pipe Dreams – Meeting Increasing Customer Demands. Grand Wailea Resort, Hotel and Spa, Wailea, Maui, Hawaii (October 29-31, 2008).
4. "New Membrane Technologies and Advancements." American Membrane Technology Association Technology Transfer Workshop – Membrane Use in the Great Lakes Area. Grand Geneva Resort and Spa, Lake Geneva, Wisconsin (October 1-2, 2008).
5. "Strategies for Addressing Endocrine Disruptors, Pharmaceuticals and Personal Care Products" Florida Section American Water Works Association Region III Young Professionals Summer Workshop – Emerging Compounds of Concern (August 28, 2008).
6. "Considerations for Blending Permeate into Water Distribution Systems." 2008 Joint American Membrane Technology Association and Southeast Desalting Association Conference and Exposition. Naples, Florida (July 14-17, 2008).
7. "Industry Advancements: Membranes, Pressure Vessels and Floating Seawater Desalting Facilities." 2008 Joint American Membrane Technology Association and Southeast Desalting Association Conference and Exposition. Naples, Florida (July 14-17, 2008).
8. "DBPs – Pros and Cons of Chloramines & Nitrication." Florida Rural Water Association 2008 Annual Conference, Daytona Beach, Florida (July 1, 2008).

9. "Stabilization of Desalted Water Supplies" 2008 AWWA Annual Conference and Exhibition. Atlanta, Georgia (June 8-12, 2008).
10. "Basic Membrane Operations." Southwest Membrane Operator Association Technology Transfer Workshop Hands-On Reverse Osmosis Water Plant Operator Training." Alameda County Water District, Fremont, California (May 29, 2008).
11. "Membrane Processes" Fundamentals of Drinking Water Treatment. College of Engineering Department of Engineering and Professional Development. University of Wisconsin. Madison, Wisconsin (May 5-6, 2008).
12. "New Membrane Technologies and Advancements." AMTA Technology Transfer Workshop, Charleston, SC (May 7-8, 2008).
13. "Total Organic Carbon Removal from Volcanic Water Supplies." Hawaii Section American Water Works Association 34th Annual Conference – Only Tap Water Delivers." Pacific Beach Hotel, Honolulu, Hawaii (April 30 – May 2, 2008).
14. "Membrane Processes for Water Treatment" Jones Edmunds University. Jones Edmunds & Associates, Inc Corporate Offices, Gainesville, Florida (April 18, 2008).
15. "General Session and Membrane Basics." Southwest Membrane Operators Association 2008 Annual Symposium Membranes on the Move." Kona Kai Resort and Spa, San Diego, California (February 3-6, 2008).
16. "Membrane Autopsies." AMTA Technology Transfer Workshop. Membrane Applications Meet Islander's Needs. Honolulu, Hawaii (December 12-13, 2007).
17. "Use of Membrane Forensics for Solving Operational Problems in Desalting Facilities." World Congress on Desalination and Water Reuse – Desalination: Quenching a Thirst. Palacio de Congresos de Maspalomas, Gran Canaria, Spain (October 21-26, 2007)
18. "Membrane Filtration Systems; Adsorption; Ion-Exchange; Aeration." Fundamentals of Drinking Water Treatment. College of Engineering Department of Engineering and Professional Development. University of Wisconsin. Madison; at US Bureau of Reclamation's Bismark, ND (September 18 – 19, 2007).
19. "Conversion from Ground Water to Surface Water – The Kauai Grove Farm Project." AWWA Annual Conference and Exposition. Toronto, Canada. (June 11-13, 2007).
20. "Membrane Processes." Southeast Desalting Association 2007 Symposium, Wave of the Future Expansion & Modification of Membrane Plants. Ft. Lauderdale, FL (June 3-6, 2007).
21. "Water Quality Deterioration in Distribution Systems." Florida Department of Environmental Protection 2007 Drinking Water Annual Meeting, St. Petersburg, FL (May 31, 2007).
22. "Membrane Forensics and its Value to Membrane Water Plants." AWWA Membrane Technology Conference & Exposition, Tampa, FL (March 18-21, 2007).
23. "Technical Interactions with Customers Experiencing Plumbing Corrosion." Florida AWWA Section AWWA 2006 Annual Conference, Renaissance Orlando Resort at SeaWorld, Orlando, FL (November 26-30, 2006).

24. "Membrane Technologies." Fundamentals of Membrane Filtration. College of Engineering Department of Engineering and Professional Development. University of Wisconsin. Madison, WI (October 11-12, 2006).
25. "Membrane Forensics and Troubleshooting Membrane Facilities." 2006 AMTA Biennial Conference and Exposition – Desalination Comes of Age. Anaheim, CA (July 31-Aug 2, 2006).
26. "Chemistry for Membrane Treatment." Southeast Desalting Association June 2006 Symposium – Advancing Membrane Treatment Together. Captiva Island (June 26-28, 2006).
27. "An Overview of Membrane Technologies." Selecting and Operating Membrane Filtration Plants. College of Engineering Department of Engineering and Professional Development. University of Wisconsin. Madison, WI (May 24-25, 2006).
28. "UpCountry Maui Corrosion Control: Scratching out a Solution." Hawaii Section AWWA 32nd Annual Conference, Honolulu, HI (May 10-12, 2006).
29. "Post Treatment and Distribution System Impacts." AWWA 2006 Desalination Symposium. Honolulu, HI (May 7-9, 2006).
30. "Chloramines and Coliform – Should You Be Concerned?" 2006 Florida Water Resources Conference – Water the Limited Resource. Orlando, FL (April 9-12, 2006).
31. "Causal Factors of Corrosion." Florida Section AWWA Corrosion Control and Monitoring Techniques Seminar. Orlando, FL (March 30, 2006).
32. "Impacts of Blending Treated Surface Water with Groundwater." Florida Section AWWA Workshop – Surface Water Treatment. Orlando, FL (February 14, 2006).
33. "Desalination and Other Options for Addressing Saltwater Intrusion." AWWA Distribution Systems Symposium Conference and Exhibition. Tampa, FL (September 18, 2005).
34. "Realistic Measures and Technologies to Prevent Saltwater Intrusion for Small Water Systems." AWWA Distribution Systems Symposium. Tampa, FL (Sept. 18, 2005).
35. "Distribution System Considerations." American Membrane Technology Association 2005 Symposium. Minneapolis, MN (August 1-3, 2005).
36. "Post-Treatment." South Central Desalting Association – Working With Membrane Technologies. San Antonio, TX (July 21-22, 2005).
37. "Hydrogen Sulfide." Florida Department of Environmental Protection 2005 Annual Drinking Water Workshop. Sarasota, FL (July 6-8, 2005).
38. "Drinking Water Quality Regulations: Drivers for Membrane Treatment Facilities." Southeast Desalting Association Spring Symposium, Bonita Springs, FL (June 26-29, 2005).
39. "Chloramines and Internal Corrosion – Is there a Connection?" 2005 Florida Water Resources Conference Water Essentials. Jacksonville, FL (April 24-27, 2005).
40. "You Can't Hide from Hydrogen Sulfide." Florida Section AWWA 2004 Conference. Orlando, FL (November 14-18, 2004).

41. "Corrosion Control Study for UpCountry Maui." Hawaii Water Works 2004 Conference. Wailea, Maui, HI. (October 20-22, 2004).
42. "Desalination in Hawaii – Can We Afford It or Can We not Afford to Do It?" Hawaii Water Works 2004 Conference. Wailea, Maui, HI. (October 20-22, 2004).
43. "Drinking Water Quality Regulations – The Current Outlook and Timeline." AMTA/SEDA Joint Symposium; Membranes – Florida's Conventional Water Treatment. Duck Key, FL (September 26-28, 2004).
44. "Post Treatment: Disinfection Corrosion Control." Southeast Desalting Association June 2004 Symposium. Stuart, FL (June 27-30, 2004).
45. "Membrane Processes Advance Safe Drinking Water." Hawaii Section AWWA 30th Annual Conference. Honolulu, HI (May 12-14, 2004).
46. "Membranes and Biofouling – A Slimy Situation." 2004 Florida Water Resources Conference Integrating Water Resources for the Future. Kissimmee, FL (April 4-7, 2004).
47. "Membrane Pretreatment for Seawater RO Desalination." 2004 Florida Water Resources Conference Integrating Water Resources for the Future. Kissimmee, FL (April 4-7, 2004).
48. "U.S. Pilot Studies." International Desalination Association Workshop, The Importance of Pretreatment in Reverse Osmosis Desalination. Tampa, FL (March 25-26, 2004).
49. "Florida Water Treatment Processes – Cost and Quality." University of Central Florida Drinking Water Conf. – Water Resources for the Decade. Orlando, FL (March 9, 2004).
50. "Use of Membranes for the Removal of TDS from Surface Water Supplies." AWWA 2004 Inorganic Contaminants Workshop. Reno, NV (February 1-3, 2004).
51. "Drinking Water Quality and Regulatory Compliance." American Membrane Technology Association Membrane Plant Management School. Kill Devil Hills, NC (December 2003).
52. "Understanding Membranes: Reverse Osmosis and Nanofiltration." Southeast Desalting Association Symposium, Membranes are to the Point. Bonita Springs, FL (October 2003).
53. "Retrofit Conversion of the Largest Hollow-Fiber Desalting Plant in the United States." IDA World Congress on Desalination and Water Reuse. Paradise Island, Bahamas (Oct., 2003).
54. "State-of-the-Art Filtration Technologies." Office of Naval Research Water Desalination Workshop, USBR, TARDEC. Crystal City, VA (May 2003).
55. "Process Conversion of the City of Sarasota's Reverse Osmosis Water Treatment Plant." Florida Water Resources Conference. Tampa, FL (May 2003).
56. "Blending Multiple Source Waters into a Common Water Distribution System." Increasing Customer Confidence During Challenging Times. Hawaii Section AWWA 29th Annual Conference. Honolulu, HI (May 2003).
57. "State-of-the-Art Filtration Systems." National Defense Industrial Association Petroleum and Water Systems Symposium II. Norfolk, VA (April 2003).
58. "Principles and Practices for Upgrading Older Desalting Facilities." AWWA 2003

- Membrane Technology Conference and Exposition. Atlanta, GA (March 2003).
59. "Non-traditional Membrane Manufacturer Testing." AWWA 2003 Membrane Technology Conference and Exposition. Atlanta, GA (March 2003).
 60. "Al Qaeda and Your Water." Florida Section American Water Works Association 2002 Seminar and Exhibits. Palm Harbor, FL (November 2002).
 61. "Membrane Process Mathematics." Southeast Desalting Association Back to the Basics Conference. Orlando, FL (October 2002).
 62. "Scale Inhibitor and Recovery Optimization for a Brackish Water Supply: Pilot Test Results and Full-Scale Experiences." IWA Membranes in Drinking and Industrial Water Production. Mülheim, Germany (September 2002).
 63. "Scale Inhibitor and Recovery Optimization for a Brackish Water Supply: Pilot Test Results and Full-Scale Experiences." American membrane Technology Association 2002 Biennial Conference. Tampa, FL (August 2002).
 64. "Optimizing Corrosion Control in Water Distribution Systems." Awwa Research Foundation Technology Transfer Conference. Seattle, WA (August 2002).
 65. "The Filtration Spectrum: MF and UF Fundamentals and the Role of Membrane Filtration in Surface Water Treatment." Southeast Desalting Association Annual Membranes in the New Millennium Symposium. Cape Captiva, FL (June 2002).
 66. "Membrane Technology." Workshop on Retrofitting and Optimizing the Operation of Drinking Water Treatment Plants. Department of Engineering Professional Development, University of Wisconsin-Madison, held in Madison, WI (May 2002).
 67. "On-Line Electrochemical Noise Corrosion Monitoring in Potable Water Distribution Systems." Exploring Development Opportunities for Safe Water. Hawaii Section AWWA 28th Annual Conference. Honolulu, HI (May 2002).
 68. "Removal of Hydrogen Sulfide from Groundwater Supplies and Residuals Control." AWWA Inorganic Contaminants Workshop. San Diego, CA (February 2002).
 69. "Membranes for Water Reuse." Emerging Issues Facing Water Reuse. Florida Water Environment Association Seminar. Lake Buena Vista, FL (January 2002).
 70. "Membrane Technology." Workshop on Retrofitting and Optimizing the Operation of Drinking Water Treatment Plants. Department of Engineering Professional Development, University of Wisconsin-Madison, held in Orlando, FL (January 2002).
 71. "Drinking Water Quality and Regulatory Compliance." American Membrane Technology/Southeast Desalting Association Technology Transfer Workshop. Palm Coast, FL (December 2001).
 72. "Hyperfiltration – Florida's Most Successful Drought Management Technique." Florida Section AWWA 2001 Seminar and Exhibits. Palm Harbor, FL (November 2001).
 73. "Upgrading Older Reverse Osmosis Water Treatment Plants." California-Nevada AWWA Fall Conference, Palm Springs, CA (October 2001).

74. "Effects of Electrical Grounding on Pipe Integrity and Shock Hazard." Valley Counties Water Association Conference. Hanford, CA (September 2001).
75. "Design of Membrane Treatment Systems." Workshop on Retrofitting and Optimizing the Operation of Drinking Water Treatment Plants. Department of Engineering Professional Development, University of Wisconsin Madison, held in Las Vegas, NV (August 2001).
76. "Reverse Osmosis and Nanofiltration Technology: Inorganic, Softening and Organics Control." American Membrane Technology Association Annual Symposium, Isle of Palms, SC (August 2001).
77. "Reverse Osmosis Basics: Mathematics." SEDA Annual Symposium, Membranes and the New Millennium. Naples, FL (June 2001).
78. "Membrane Technology." Workshop on Retrofitting and Optimizing the Operation of Drinking Water Treatment Plants. Department of Engineering Professional Development, University of Wisconsin Madison, held in Madison, WI (May 2001).
79. "Membrane Processes for Small System Compliance with the Safe Drinking Water Act." Third NSF International Symposium on Small Drinking Water and Wastewater Systems. Washington, D.C. (April 2001).
80. "Costs of Membrane Processes." 2001 AWWA Membrane Technology Conference and Exhibition. San Antonio, TX (March 2001).
81. "Membrane Replacement in Reverse Osmosis Facilities." 2001 AWWA Membrane Technology Conference and Exhibition: The Future of Purer Water. San Antonio, TX (March 2001).
82. "Membrane Technology." Workshop on Retrofitting and Optimizing the Operation of Drinking Water Treatment Plants. Department of Engineering Professional Development, University of Wisconsin Madison, held in Kissimmee, FL (January 2001).
83. "Integration of Lime Softening and Ultrafiltration for Surface Water Treatment: A Powerful Water Quality Combination." AWWA Water Quality Technology Conference. Salt Lake City, UT (November 2000).
84. "Integrating an Immersed Membrane Ultrafiltration Process into an Existing Lime Softening Water Treatment Plant." International Conference on Membranes in Drinking and Industrial Water Production, International Water Association, AWWA, European Desalination Society, and Japan Water Works Association. Paris, France (October 2000).
85. "Water Utility Issues." Guam Society of Professional Engineers Meeting. Agana, Guam, Mariana Islands (October 2000).
86. "Membrane Replacement in Desalting Facilities." International Conference on Membranes in Drinking and Industrial Water Production, International Water Association, AWWA, European Desalination Society, and Japan Water Works Association. Paris, France (Oct. 2000).
87. "Membrane Processes and the Design of Membrane Treatment Systems." Workshop on Retrofitting and Optimizing the Operation of Drinking Water Treatment Plants. Department

- of Engineering Professional Development, University of Wisconsin Madison in cooperation with the University of Nevada-Las Vegas, held in Las Vegas, NV (August 2000).
88. "Assessment of Integrated Membrane Systems for a Coastal Florida Surface Water Supply." American Desalting Association's 2000 North American Biennial Conference and Exposition, 21st Century Water Challenges. South Lake Tahoe, NV (August 2000).
 89. "Disinfection By-Product Chemistry." Florida Rural Water Association Annual Conference, Orlando, FL (August 2000).
 90. "Process and the Design of Membrane Treatment Systems." Workshop on Retrofitting and Optimizing the Operation of Drinking Water Treatment Plants. Department of Engineering Professional Development, University of Wisconsin Madison in cooperation with the Michigan Department of Environmental Quality, held in Ann Arbor, MI (July 2000).
 91. "Future Forecasts for Membranes." Southeast Desalting Association Biannual Desalting Symposium. Jupiter, FL (June 2000).
 92. "Equipment Technology Verification Protocols – Quality and Utility to Consulting Engineers." Georgia Environmental Protection Depart. Conference, Atlanta, GA (May 2000).
 93. "Engineering and Construction Considerations for Integrated Membrane Systems." Georgia Environmental Protection Department Conference, Atlanta, GA (May 2000).
 94. "Membrane Replacement at the City of Sarasota's Hollow-Fiber Desalting Facility." 2000 Florida Water Resources Conf., Tampa, FL (April 2000).
 95. "Membrane Case Studies: Past, Present, Future." International Conference on Membrane Technology in Water and Wastewater Treatment. European Desalination Society and Royal Society of Chemistry. Lancaster University, Lancaster, United Kingdom (March 2000).
 96. "Disinfection and Corrosion Control." Southeast Desalting Association Biannual Desalination Symposium, Water Supplies for Southeastern United States and Caribbean, Orlando, FL (November 1999).
 97. "The Chemistry of Disinfection By-Products." Florida Depart. of Environmental Protection 1999 Water Facilities Meeting Drinking Water Session, Clearwater, FL (June 1999).
 98. "Future Forecasts for Membrane Processes in the United States." Southeast Desalting Association Desalination Symposium, Sundial Beach Resort, Sanibel Island, FL (June 1999).
 99. "Comparison of Hollow-Fiber and Spiral-Wound Ultra-Low Pressure Membrane Technologies on a Brackish Ground Water." 1999 Florida Water Resources Conference, Tallahassee, FL (April 1999).
 100. "Interstage Turbines as Self-Regulating Osmotic Pressure Control Valves in a Desalting Facility." 1999 AWWA Membrane Technologies Conference. Long Beach, CA (March 1999).
 101. "Comparison of Hollow-Fiber and Spiral-Wound Ultra-Low Pressure Membrane Technologies on a Brackish Ground Water." 1999 AWWA Membrane Technologies Conference. Long Beach, CA (March 1999).

102. "The Olivenhain Water Supply Project and Integrated Membrane Systems." National Water Research Institute Microfiltration II Conference, San Diego, CA (November 1998).
103. "Engineering and Construction Considerations for Integrated Membrane Systems." 1998 Florida Section Annual Conference, Orlando, FL (November 1998).
104. "Protocols for the Removal of Synthetic Organic Chemical Contaminants and Radionuclides by Membrane Technologies." 1998 AWWA Water Quality Technology Conference, San Diego, CA (November 1998).
105. "Impact of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality." Association of State Drinking Water Administrators 1998 Annual Conference, Keystone, CO (Oct., 1998).
106. "Membrane Technology and Water Quality." 86th Annual Texas Municipal League Conference, San Antonio, TX (October 1998).
107. "Post Treatment and Disinfection." Southeast Desalting Association Operating the Membrane Plant Post-Treatment and Cleaning Workshop, Ft. Lauderdale, FL (Oct. 1998).
108. "The Role of Membranes in Drinking Water Production in the United States." 1998 Conference on Membranes in Drinking and Industrial Water Production, Amsterdam, The Netherlands, (September 1998).
109. "Impact of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality." AWWA Research Foundation Technology Transfer Workshop, San Francisco, CA (August 1998).
110. "Investigation of the Causal Factors of Performance Decline in a Hollow-Fiber Desalting Facility." 1998 American Desalting Association Biennial Conference and Exposition, Williamsburg, VA (August 1998).
111. "Removal of Hydrogen Sulfide." Florida Department of Environmental Protection 1998 Annual Meeting, Safety Harbor, FL (July 1998).
112. "Water Quality Challenges." Florida Department of Environmental Protection 1998 Annual Meeting, Safety Harbor, FL (July 1998).
113. "Membrane Process Mathematics." Southeast Desalting Association Operating the Membrane Plant Treatment Train Operation Workshop, Ft. Myers, FL (June 1998).
114. "Enhanced Coagulation and TOC Removal for a Florida Surface Water Supply." 1998 AWWA Annual Conference and Exhibition, Dallas, TX (June 1998).
115. "Innovative Use of an Interstage Turbine for Energy Recovery and Enhanced Water Production at a Membrane Desalting Facility." 1998 AWWA Annual Conference and Exhibition, Dallas, TX (June 1998).
116. "Impact of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality." American Backflow Prevention Association Conference, Tempe, Arizona (April 1998).
117. "Enhanced Coagulation and TOC Removal for a Florida Surface Water Supply." 1998 Florida Water Resources Conference, Ft. Lauderdale, FL (April 1998).
118. "Innovative Use of an Interstage Turbine for Energy Recovery and Enhanced Water

- Production at a Membrane Desalting Facility.” 1998 Florida Water Resources Conference, Ft. Lauderdale, FL (April 1998).
119. “Impact of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality.” New England AWWA Joint Operations Conference, Marlborough, MA (March 1998).
 120. “Carbonic Acid Air Stripping Process for Hydrogen Sulfide Removal.” 1998 AWWA Inorganics Contaminants Workshop, San Antonio, TX (February 1998).
 121. “Impact of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality.” AWWA Research Foundation Technology Transfer Workshop, The Research Advantage: Putting Breakthroughs in Drinking Water Science to Work for You, Atlanta, GA (February 1998).
 122. “Basic Feed Water Chemistry.” Southeast Desalting Association Operating the Membrane Plant Workshop, Key Largo, FL (October 1997).
 123. “Investigation of Calcium Sulfate Supersaturation to Increase Yield from a Limited Resource.” 1997 International Desalting Association World Congress in Desalination and Water Reuse, Madrid, Spain (October 1997).
 124. “Implementation of Lead and Copper Corrosion Control Demonstration Test Programs for Three Florida Utilities.” 1997 AWWA Annual Conference and Exhibition, Atlanta, GA (June 1997).
 125. “Impacts of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality.” AWWA Research Foundation Technology Transfer Workshop for Managers Only, Meeting the Management Challenge Through Research, Galveston Island, TX (May 1997).
 126. “Post-Treatment.” Southeast Desalting Association Membrane Processes for Water Treatment Workshop, Longboat Key, FL (May 1997).
 127. “Impacts of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality: Inorganic, Organic and Microbiological Findings.” 1997 Florida Water Resources Conference, Orlando, FL (April 1997).
 128. “Basic Water Chemistry.” 1996 Florida Department of Environmental Protection Annual Meeting, Naples, FL (October 1996).
 129. “Post-Treatment, Degassification, Blending, Chlorination, and pH Adjustment.” Southeast Desalting Association Operating the Membrane Plant Part III Post Treatment Workshop. Key Largo, FL (October 1996).
 130. “Coping with a Variable TDS Brackish Water During the Retrofit Expansion of a Desalting Facility.” 1996 American Desalting Association Biennial Conference and Exhibition, Monterey, CA (August 1996).
 131. "Impact of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality: Inorganic, Organic and Microbiological Findings." 1996 AWWA Annual Conference and Exhibition, Toronto, Ontario, Canada (June 1996).
 132. “Grounding Can Affect Water Quality.” 1996 Florida Water Resources Conference, Ft. Myers, FL (May 1996).

133. "Membrane Processes." Florida Department of Environmental Protection Membrane Technology Workshop, Tampa, FL (March 1996).
134. "Grounding Can Affect Water Quality." AWWA Research Foundation Technology Transfer Workshop, Meeting the Management Challenge Through Research, Tampa, FL (February 1996).
135. "Implementation of Lead and Copper Corrosion Control: Demonstration Test Programs for Three Central Florida Utilities." 1995 Florida Water Resources Conference, Jacksonville, FL (April 1995).
136. "Membrane Process Post-Treatment." Southeast Desalting Association Membrane Processes for Water Treatment Conference, Kissimmee, FL (January 1995).
137. "Comparison of Carbon Dioxide and Sulfuric Acid Pretreatment of Packed Towers for Hydrogen Sulfide Removal from Groundwater" 1994 AWWA Water Quality Technology Conference, San Francisco, CA (November 1994).
138. "Comparison of Carbon Dioxide and Sulfuric Acid Pretreatment of Packed Towers for Hydrogen Sulfide Removal from Groundwater" 1994 Florida Water Resources Conference, Tampa, FL (August 1994).
139. "Balancing Multiple Water Quality Requirements of the Safe Drinking Water Act." 1993 Florida Water Resources Conference, Orlando, FL (November 1993).
140. "Membrane Process Post-Treatment." AWWA 1993 Membrane Technology Conference, Baltimore, MD (August 1993)
141. "Modeling the Permeate Transient Response in a Membrane Softening Process." AWWA 1993 Annual Conference/Exposition, San Antonio, TX (June 1993)
142. "Solute Charge and Molecular Weight Modeling for Prediction of Solute Mass Transfer Coefficients." 1992 Florida Water Resources Conference, Daytona Beach, FL (Oct. 1992).
143. "Evaluation of the Homogeneous Solution Diffusion Model Using Membrane Mass Transfer Coefficients and Operational Parameters." AWWA 1992 Annual Conference/Exposition, Vancouver, British Columbia, Canada (June 1992).
144. "Radionuclides in Membrane Concentrate Streams." Florida Section AWWA Safe Drinking Water Act Seminar, Ft. Lauderdale, FL (May 1992).
145. "Physical and Chemical Methods for Zebra Mussel Control." Florida Section American Chemical Society 1992 Annual Meeting, Cocoa Beach, FL (May 1992).
146. "Florida's Total Organic Carbon Problem and Trihalomethanes." Florida Section AWWA Safe Drinking Water Act Seminar, Daytona Beach, FL (May 1991).
147. "Synthetic Organic Compound Removal Using Nanofiltration." Florida Section American Chemical Society 1991 Annual Meeting, Tampa, FL (May 1991).
148. "Modeling Membrane Mass Transfer Using Dimensional Analysis." AWWA Membrane Process Conference, Orlando, FL (March 1991).

149. "Investigation and Modeling of Membrane Mass Transfer." NWISA 1990 Biennial Conference, Walt Disney World, Orlando, FL (August 1990).
150. "SOC Rejection by Nanofiltration." AWWA 1989 Annual Conference and Exhibition, Los Angeles, CA (July 1989).

GRADUATE STUDENT RESEARCH SUPERVISION

Doctoral Degrees

Dr. Abdulrahman A. Alshehri. Completed: Summer 2008 (Duranceau was Co-Chair with Dr. J.S. Taylor, P.E.). Title: "Impact of Corrosion Inhibitor Blended Orthophosphate on Water Quality in Water Distribution Systems."

Dr. Phillip Lintereur, Completed: December 2008 (Duranceau was Co-Chair with Dr. J.S. Taylor, P.E.). Title: "*Effects of Source Water Blending Following Treatment with Sodium Silicate as a Corrosion Inhibitor on Metal Release Within a Water Distribution System.*"

Dr. Erica Stone; Completed: December 2008 (Duranceau was Co-Chair with Dr. J.S. Taylor, P.E.): Title: "*Effects of Orthophosphate Corrosion Inhibitor in Blended Water Quality Environments.*"

Mr. Jayapregasham Tharamapalan (current student; topic not yet proposed; Duranceau serves as Chair).

Master's Degrees

Ms. Susaye Douglas (Duranceau is Chair – student is active in MS Degree Program) – Title: "*Post-Treatment Stabilization of Desalinated Permeate.*" Anticipated Completion – Summer 2009.

Mr. Vito Trupiano (Duranceau is Chair– student is active in MS Degree Program) – Title: "*Evaluation of Oxidation and Filtration Treatment for Hydrogen Sulfide Removal From Ground Water.*" Anticipated Completion – Summer 2010.

CURRENT POSITIONS HELD BY DEGREE RECIPIENTS

Abdul A. Alshehri.	Ph.D.	Engineer, Consultancy, Saudi Arabia.
Phillip Lintereur	Ph.D.	Engineer, Alan Plummer Assoc., Inc, Ft. Worth, TX
Erica Stone	Ph.D.	Engineer, Carollo, Orlando, FL

TEACHING EFFECTIVENESS

University of Central Florida, Orlando, FL
 Civil, Environmental and Construction Engineering
 Student Perception of Instruction (Reported as % Response by Category)

Semester	Course No.	Excellent	Very Good	Good	Fair	Poor	Total Responding	Total Enrolled
Fall 2007	ENV3001	32.14	39.29	17.86	10.71	0	28	31
Spring 2008	ENV3001	43.48	43.48	8.70	4.35	0	23	36
Fall 2008	ENV4202	46.85	42.16	10.99	0	0	20	23
Spring 2009	ENV4652	In	Progress					15
Spring 2009	ENV3001	In	Progress					74

University of Wisconsin, Madison, WI
 College of Engineering Department of Engineering Professional Development
 Instructor Evaluations (Based on a scale of 5.0 points)

Short Course Dates	Course Name	Content	Presentation Skills	Handouts	Slides	Total Responses
April 17-18, 2007	Fundamentals of Membrane Filtration	4.53	4.76	4.25	4.24	18
June 13-14, 2007	Fundamentals of Drinking Water Treatment	4.82	4.55	4.09	4.4	11
Sept. 18-19, 2007	Fundamentals of Drinking Water Treatment	4.39	4.29	4.00	4.23	23
May 5-6, 2008	Membrane Filtration Technology	4.67	4.79	4.57	4.54	17

RESEARCH FUNDING AT UNIVERSITY OF CENTRAL FLORIDA

Current (Active) Research Projects

Sponsor: Polk County Utilities Division, Polk County, Florida
Title: Evaluation of Alternative Sulfide Treatment Processes
Dates: October 1, 2008 – December 1, 2009
Funding: \$124,749

Sponsor: UCF College of Engineering and Computer Science
Title: Effects of Stray Current on the Corrosion of Rebars
Dates: October 1, 2007 – May 1, 2009
Funding: \$7,500
Percent Responsibility: 50% (Dr. Necati Catbas, Co-PI)

Sponsor: RF: Jones Edmunds Research Fund
Title: Jones Edmunds Research Fund
Dates: June 12, 2007 – December 31, 2009
Funding: \$30,000
Percent Responsibility: 100%

Sponsor: American Water Works Association Research Foundation
Title: Post-Treatment Stabilization of Desalted Water
Dates: July 26, 2007 – August 1, 2009
Funding: \$150,000 (In-Kind \$155,000)
Percent Responsibility: 100%

TOTAL **\$293,499 (July 5, 2007 to December 31, 2009)**
Prior to UCF, 1996-2006: Total Funding \$10,760,000

PROJECT EXPERIENCE

Water Research Foundation (Formerly Awwa Research Foundation) Research Projects

1. Awwa Research Foundation Post-Treatment Optimization of Desalinated Water.

Principal Investigator responsible for the development of a guidance manual and research needs document regarding post-treatment of desalination plants.

2. AWWA Research Foundation Optimizing Corrosion Control in Water Distribution Systems, Denver, CO.

Principal investigator and project manager responsible for the demonstration of state-of-the-art on-line technology (electrochemical noise) for corrosion monitoring in water distribution systems.

3. AWWA Research Foundation Water Quality Requirements for Industrial Applications of Reclaimed Water, Denver, CO.

Technical leader providing water quality technical expertise to assist in the development of a guidance manual for industrial and ecological applications and known beneficial uses of reuse water. Applicable water quality requirements are provided as a means to evaluate the feasibility of a water reuse program.

4. AWWA Research Foundation Investigating Pipe Cleaning Methods, Denver, CO.

Project engineer providing technical expertise on water quality to assist in the development of a guidance manual on planning and implementing pipe cleaning programs, including an overview of existing and emerging pipe cleaning methodologies and technologies. The document provides general guidance for determining which distribution mains and pipes to clean, how often to clean them, and what methods apply. The document also discusses what considerations are important and how best to measure the results of a pipe cleaning program.

5. AWWA Research Foundation Effects of Electrical Grounding on Pipe Integrity and Shock Hazard, Denver, CO.

Principal investigator and project manager responsible for the evaluation of the relationship between electrical currents and service life of distribution pipe materials, and provided guidelines to investigate the potential for electrical shock hazard to utility personnel. The study included evaluating the distribution systems of 20 large utilities spread geographically across the US. The analysis evaluated the relationship between electrical currents and service life of distribution pipe materials.

6. AWWA Research Foundation Identify Causes and Solutions for External Corrosion on Buried Water Mains, Denver, CO.

Project engineer responsible for support of a project relative to buried infrastructure and impacts on corrosion of water distribution systems, with focus on stray current, electrical grounding and lightning-strike impacts on water mains.

7. AWWA Research Foundation Impact of Wet Pipe Fire Sprinkler Systems on Drinking Water, Various locations in the United States and Canada.

Principal investigator and project manager responsible for a study that included performing a survey to investigate fire sprinklers and potable water quality in distribution mains to determine if there is a significant health hazard associated with wet-pipe fire sprinklers and impacts on public health. The study included over 30 large utilities spread across North America.

8. AWWA Research Foundation Membrane Process Water Plant Survey.

Conducted a potable water membrane plant survey involving over twenty Florida operations and technical

literature review for an AWWA Research Foundation sponsored project. Served as a major co-author of final report.

Pilot-Plant Research and Development Projects

- 1. Dunedin Membrane Biofouling Pilot Plant Evaluation, Dunedin, FL.** Project manager responsible for the evaluation of biofouling control methods for a 9.5-mgd nanofiltration (membrane softening) water treatment process. Project included the design, construction, and operation of a single-stage pilot plant to study biofouling control methods. Chloramination and/or brackish water blending alternatives were evaluated during a four month time period.
- 2. Marco Island Integrated Membrane WTP Pilot Plant, Marco Island, FL.** Project manager for an evaluation of integrated membrane systems using combinations of MF, UF, NF and RO membrane processes in order to treat Marco Lakes raw water supply water through the use of pilot-scale equipment located at the Marco Island lime softening WTP.
- 3. Deltona Water System Membrane Pilot Plant, Deltona, FL.** Project manager and technical leader for testing membrane softening process as it correlates to total organic removal in a site-specific, pilot scale study. This project included professional engineering services in implementing membrane pilot plant testing per the requirements of the Information Collection Rule (ICR). The treatment studies provided cost and performance data on membrane processes for meeting SDWA disinfectant/disinfection by-product regulations.
- 4. Orange County Packed Tower Pilot Plant Study, Orlando, FL.** Project engineer responsible for the comparison of sulfuric acid and carbon dioxide pretreatment for sulfide removal. Project entailed monitoring, operation, and evaluation of a 50-gpm two-stage packed tower air scrubbing odor control pilot.
- 5. Oviedo West Mitchell Hammock Water Treatment Facility Water Quality and Pilot Testing Program.** Project manager evaluating water quality via pilot plant program for a hydrogen sulfide removal processes including forced-draft aeration and membrane processes. Project also included evaluation of alternative odor control technologies.
- 6. Irvine Ranch Water District Deep Aquifer Treatment System Membrane Pilot Plant Design and Specification, Irvine, CA.** Project manager for the design and specification of an in-plant membrane pilot plant used for color removal. This project was in support of the design-build phase of the Deep Aquifer Treatment System for the construction of an 8-MGD membrane water treatment plant used to remove high levels of color from groundwater.
- 7. San Patricio Texas Seawater RO Pretreatment Pilot Study, Denver, CO.** Project manager for quality control. Scope of services included providing quality assurance and quality control reviews for a project being performed by Aqua Resources International for the US Bureau of Reclamation relative to a pilot study to demonstrate and compare conventional pretreatment versus membrane filtration pretreatment prior to a seawater reverse osmosis process. Included recommendations on pilot plant design, test protocol, data collection and monitoring plan, data evaluation process, cost analysis and reviews of the draft final report summarizing the findings and results of the pilot evaluation.
- 8. North Miami Beach Pilot Plant, North Miami Beach, FL.** Project manager and technical leader for professional services to provide USEPA Information Collection Rule pilot testing to

evaluate water treatment processes. This project involved testing membrane softening processes as it correlates to total organic removal in a site-specific, pilot-scale study.

9. Venice Reverse Osmosis Enhanced Recovery Pilot Plant, Venice, FL. Project manager responsible for conducting a pilot program to evaluate pretreatment and recovery methods for operating an existing reverse osmosis process. Project included design, preparation of operation protocols, and program implementation for a low-pressure, single-stage 4.0-mgd RO pilot plant. The project was co-funded by the Southwest Florida Water Management District Basin Board.

10. Membrane Pilot-Plant Evaluation, USEPA. As project manager, designed, constructed, operated, and prepared a final report on an EPA-sponsored SDWA potable water project involving a low-pressure membrane softening nanofiltration pilot process for the removal of inorganic, natural organic, and synthetic organic compounds from groundwater in Florida. Also included a chloride tracer and residence time evaluation for the softening process.

Corrosion Research Studies and Investigations

1. County of Maui Lead Control Strategy, Maui, HI. Project Manager and principal investigator for a corrosion control study funded by USEPA of the County's Upcountry water system having elevated lead levels. Project included preparation of a Quality Assurance Project Plan. Evaluation included corrosion control loop testing using linear polarization probes and coupons, jar tests for granular activated carbon and ion exchange, field evaluations of distribution system components, service line profiling and service line extraction testing.

2. City of Marco Island Investigation of Drinking Water Quality and Residential Copper Tube Pitting Corrosion, Marco Island, FL. Project manager investigating customer complaints regarding pinhole-type leaks in single-family residences. Conducted a workshop with City staff to provide technical information regarding pitting corrosion of copper tubing used for water supply in residential construction. Reviewed existing treatment and distribution practices and historical water quality delivered to the homeowners experiencing pitting; assessed field and lab water quality data collected by City within the distribution system. Performed multiple customer (homeowner) structure site visit(s) accompanied by City's representatives.

3. Altamonte Springs Lead and Copper Corrosion Control Study, Altamonte Springs, FL. As project engineer, prepared a desk-top study, identified treatment, secondary impacts, and implemented a full-scale demonstration study using phosphate inhibitors for a medium water system with four water treatment plants. Responsible for Lead and Copper Rule (LCR) assistance to the city of Altamonte Springs. Collected data, responded to EPA notice of violation, prepared desktop evaluation, developed demonstration test protocol, performed system demonstration tests and monitoring, provided construction permit application.

4. Eastern Service Area Corrosion Control Study, Orlando, FL. Project engineer responsible for a source water quality study, desk-top evaluations, and design and implementation of a pilot plant testing program involving chemicals for corrosion control and pH stabilization. Project involved a LCR corrosion control study to develop water distribution system corrosion control alternatives for copper and lead. The study used linear polarization probes for on-line data gathering and metal coupons for weight loss measurement.

5. Guam-US Navy Corrosion Control and Protection Plan, Marianna Islands, Guam.

Project manager and technical leader for a program implemented by the Guam Engineering and Management Division for Public Works Center Utilities of the U.S. Navy (NAVFACENCOM Marianas Islands, Contract No. N62766-96-D-0006) to perform an engineering investigation and produce a desk-top corrosion control and protection plan for the US Navy's potable water system on Guam. The Navy's water system on Guam is more than 45 years old and contains a conventional coagulation-sedimentation-filtration surface water treatment plant, several small well water disinfection facilities, nearly 65 miles of predominantly unlined, 12-inch cast iron water main and 150 miles of smaller water service lines.

6. Pinellas County Corrosion Inhibitor Screening and Evaluation, Pinellas County, FL.

Project manager. Scope of services included evaluating the effectiveness of up to four manufactured inhibitor products on corrosion control using electrochemical probe methods. This information provided Pinellas County Utilities documentation for developing bids.

7. Winter Park Lead and Copper Corrosion Control Study, Winter Park, FL. Project engineer for a desk-top evaluation, treatment identification, and implementation of a full-scale demonstration using pH adjustment. This project included engineering services in connection with lead and copper rule compliance, corrosion control testing, laboratory analyses, recommendations, and implementation. The demonstration test involved the installation and operation of pH adjustment facilities, which utilized caustic soda, at one of the city's four water treatment plants. The results of the study indicated that pH adjustment would reduce copper corrosion below acceptable levels and should be implemented at all four water treatment plants.

8. Mission Hill Lead and Copper Rule Compliance, Santa Barbara County, CA. Provided quality control. Scope of services included analysis of water quality and proposed copper corrosion control techniques for Mission Hills Community Services District well water.

9. Water Quality & Corrosion Investigation - D. Creek, Sarasota County, FL. Technical Leader. Provided assistance relative to water quality and performed the following tasks: reviewed existing water treatment and distribution practices and available historical information regarding water quality delivered to the Deer Creek development; assessed water quality data collected within the distribution system; and performed a workshop with County staff to review/discuss issues and provide technical information regarding the topic of pitting corrosion of copper tube in residential water distribution systems, highlighting the existing experience with water systems regarding impacts and causal factors surrounding pitting corrosion.

10. Polk County Lead and Copper Corrosion Control Study for the Imperiallakes Water Treatment Plant, Polk County, FL. Engineer-of-record responsible for identifying treatment and secondary impacts, and implementing a full-scale demonstration study using sodium hydroxide pH adjustment. Scope of services for this project included a study and information brochure support. The preparation of a full-scale demonstration study required development of detailed test plans and protocols for implementation activities. The "Leaky Copper Piping" brochure, required finalization, printing, and folding of the 6,000 information brochures on copper pipe corrosion.

11. Polk County Small System Lead and Copper Corrosion Control Studies, Polk County, FL. Engineer-of-record responsible for identifying treatment, secondary impacts, and guidelines for implementing treatment using phosphate inhibitors. Project involved the preparation of desk-top studies for the Lake Garfield, Four Corners, and Lake Wales PWSs.

12. Florida Water Services Small System Lead and Copper Corrosion Control Studies, Orlando, FL. Engineer-of-record responsible for performing a desk-top investigation as well as the design specifications of standard chemical feed facilities, and included desk-top computer modeling investigations related to 12 small system water treatment plants.

13. Altamonte Springs Lead and Copper Corrosion Control Effectiveness Report, Altamonte Springs, FL. Project manager responsible for preparing a report to the Florida Department of Environmental Protection on the effectiveness of the corrosion control program.

14. Desk Top Corrosion Evaluation Reclaimed Water, Altamonte Springs, FL. This project consisted of a desktop evaluation of the corrosion potential of the City's Reclaimed Water. This is based upon observed corrosion of existing gate valves in the City's system.

Membrane Process Design and Evaluation

1. Olivenhain Municipal Water District Water Storage and Treatment Facilities Ultrafiltration Membrane WTP, San Diego County, CA. Project engineer and technical leader assisting in the Olivenhain Water Storage Project, which in part included development of a 25-MGD expandable to 60-MGD immersed ultrafiltration membrane water treatment plant, including pipelines, a pump station, and flow control facilities. Oversaw the District's pilot testing program of integrated membrane processes treating Colorado River Water. The pilot testing was conducted at the U.S. Bureau of Reclamation's Yuma Arizona Water Quality Improvements Center. As part of the process design team, participated in the ranking and selection of the membrane process vendor and review of process design specifications.

2. Irvine Ranch Water District Deep Aquifer Treatment System Membrane Design-Build Design, Construction and Start-Up Assistance, Irvine, CA. Technical leader for the support of the construction as the Owners-representative of an 8-MGD membrane water treatment plant used to remove high levels of color from groundwater. Participated in design and design reviews, shop drawing reviews, construction meetings, start-up assistance and troubleshooting. One important aspect was the overseeing of unique membrane verification testing of the nanofiltration membranes supplied by the membrane manufacturer.

3. Brazos River Authority (BRA) Surface Water and Treatment System (SWATS) Membrane Plant Evaluations, Granbury, TX. Project manager and principal investigator for a critical assessment, evaluation and investigation of BRA's 15 mgd SWATS lime softening, ultrafiltration, reverse osmosis, electro dialysis reversal and filtration integrated water treatment plant. Provided an opinion to explain the causal factors of membrane fouling and performance decline of BRA's ultrafiltration (fiber breakage), reverse osmosis (fouling) and electro dialysis reversal (manufacturer design flaws) membrane processes. The work consisted also of pre-litigation support services. Recommendations included general remediation actions, rehabilitation options, operation alterations and maintenance (cleaning) improvements.

4. Marco Island Integration of Immersed Ultrafiltration into an Existing Lime Softening WTP and Process Upgrades, Marco Island, FL. Project manager for expansion and refurbishment of 5.0 mgd lime softening WTP with addition of 1.67 mgd immersed ultrafiltration process. Services included study phase evaluations, design and specification document preparation, permitting services, bidding phase assistance, construction phase services, on-site observation services and start-up services. *This project represented the first UF process*

permitted for construction in the state of Florida.

5. T. Mabry Carlton Jr. Electrodialysis Water Treatment Plant Monthly Operations Reporting, Sarasota, FL Project engineer for post-construction engineering services for Sarasota County's 12-MGD EDR water treatment plant. Reviewed data of the EDR process plant piping, chemical feed equipment, buildings, plant site work, high service pumps, and storage tanks. Tasks included information compilation, dissemination, process trending, and monthly operations reporting. The work was implemented on a monthly basis for one year in order to document operator performance to verify that the manufacturer's warranty was met.

6. Sarasota Reverse Osmosis WTP Retrofit Design and Specifications as the Owner's Representative for Design-Build Process Retrofit, Sarasota, FL. Project Manager and Engineer-of-Record for the design and specification documents used for permitting purposes and to determine design-build requirements for the process retrofit of an existing 4.5 MGD of hollow-fiber desalination membranes to newer spiral-wound desalination membranes including ancillary improvements such as pretreatment, feed pumping, process instrumentation upgrades and cleaning system improvements. The brackish water process retrofit program included evaluation of qualifications of design-build proposer teams, assistance in the evaluation of proposals and bidding costs, construction services, start-up assistance and process performance reviews and ancillary assistance to Owner during the construction phase. *This project was the 2004 Grand Award winner in the Florida Institute of Consulting Engineers water and wastewater engineering competition.*

7. Marco Island 2.0-mgd Reverse Osmosis Retrofit Expansion, Marco Island, FL. Project manager responsible for a plant assessment and evaluation of existing facilities. Also engineer-of-record responsible for preliminary design, final design, construction phase, and start-up services for a 2.0-mgd retrofit expansion. Project included the expansion of the existing 4.0-mgd brackish water ROWTP capacity by 2.0 mgd to 6.0 mgd for treatment of 10,500 mg/L TDS feed water to achieve a finished permeate water of 125 mg/L TDS. The expansion was performed in two separate construction contracts (each 1.0 mgd). The retrofit included the innovative use of an inter-stage turbine for energy recovery and increased productivity.

8. Nanofiltration Water Treatment Design - Moody Air Force Base, Valdosta, GA. Project Manager. Was responsible for services related to the design and performance specification of nanofiltration membrane softening process and required pretreatment. The nanofiltration membrane process was designed to produce 1.2 MGD permeate flow and is expandable to 1.5 MGD permeate flow, assuming an 85% water recovery rate and 10% raw water bypass. Project included: preliminary engineering report, preliminary design, basis of design and final design; general permitting and review, exclusions and additional provision and timeframe.

9. City of Dunedin Membrane Plant Feed Valve Replacement Program, Dunedin, FL. Project manager responsible for the evaluation, planning and design of a membrane replacement program for the City's 9.5 MGD membrane softening facility. Developed a plan for the replacement that included demonstration testing of three manufacturer membrane products using full-scale (8.5-inch diameter) spiral-wound membranes and specification development. Additional design work was required to modify and replace the plant's process feed valves and associated controls. Project included bidding phase services to assist in vendor bid package and shop drawing reviews. Also responsible for assessment of membrane plant

replacement and associated acceptance testing prior to placing the process back into service. A portion of the project included the evaluation of preserved and stored membrane elements.

10. Collier County Regional 20-MGD Membrane Softening Treatment Plant, Naples, FL.

Project engineer that assisted during the construction phase of the project. Also responsible for start-up testing, operator training, and evaluation performance of membrane process, including sample collection and analysis, preparation of water quality monitoring programs, and evaluation of water quality on permeate and concentrate streams. Plant was designed for 12 MGD with a planned future expansion to 20 MGD, with concentrate disposal through deep well injection. The design provided flexibility for conversion to low-pressure reverse osmosis.

11. Reverse Osmosis Water Treatment Plant Expansion Preliminary Design, Jupiter, FL.

Project manager for the preparation of a preliminary design (30 percent) for the expansion of the Town of Jupiter's Reverse Osmosis Water Treatment Plant by 1.7 mgd peak-day permeate flow. The preliminary design process phase evaluated the existing facilities to determine which components need to be expanded, modified to support the new treatment process train.

12. Burnt Store Reverse Osmosis Water Treatment Plant, Punta Gorda, FL. Project manager for developing a master site development plan and conceptual design phase. Project included the development of a master site development plan and conceptual design phase in support of the expansion of the 2.0 MGD Burnt Store ROWTP for treatment of brackish water and radionuclides. The master site plan serves as a conceptual layout of the facilities for the ultimate build-out capacity.

13. Melbourne Reverse Osmosis WTP Assessment, Melbourne, FL. Project manager for a project to evaluate the City of Melbourne's reverse osmosis water treatment plant to determine if the 5.0 MGD ROWTP was ready for membrane replacement. Project also evaluated the use of ultra-low pressure membranes for replacement and reviewed the existing pretreatment processes to identify potential enhancements.

14. Marco Island Reverse Osmosis Plant Membrane Replacement Program, Marco Island, FL. Project manager responsible for development of a test plan and protocol for membrane replacement activities for the 6.0-MGD process. Project included a scale inhibitor demonstration in order to document the effectiveness of scale inhibitor without the use of pH adjustment pretreatment using sulfuric acid.

15. U.S. Air Force Manta Ecuador Seawater Desalination Study, Manta, Ecuador. Project manager responsible for an evaluation of the costs, performance, advantages and disadvantages of the treatment of seawater using either thermal distillation or reverse osmosis technologies. The project was for the Mobile District Army Corps of Engineers in support of the United States Air Force Air Combat Command's Forward Operating Location in Manta, Ecuador.

16. U.S. Air Force Manta Ecuador Ceiba WTP Integrated Membrane Process Design, Manta Ecuador. Project Manager. Provided engineering services related to the development of a conceptual design for a 0.04 MGD surface water treatment plant consisting of microfiltration, nanofiltration, granular activated carbon adsorption, chlorine disinfection and corrosion control. The water supply will be conventionally treated river water from Ceiba, which is approximately 20 miles from the U.S. Air Force base in Manta, Ecuador. Additional treatment is required at the base for drinking and cooking so that reliance upon bottled water supplies can be reduced.

17. NSF International Membrane Filtration Verification Report Review, Ann Arbor, MI. Project Manager. This project consisted of a technical review of four ETV verification reports pertaining to membrane technologies. The verification reports were provided to NSF by EPA field-testing organizations per the terms of protocols developed for the treatment technologies used in packaged and/or modular drinking water treatment systems for small public or private water suppliers. Reviewed literature, provided comments on the technical integrity of the data and results derived during the testing period.

18. Jupiter ROWTP Membrane Replacement Desk Top Evaluation, Jupiter, FL. Project Manager. Scope of services included assisting the Town of Jupiter in performing an engineering desk-top evaluation that studied the existing ROWTP membrane process trains containing Hydranautics CPA-2 membranes. Services evaluated membrane replacement considering impacts on process hydraulics and train arrangements; impacts on energy recovery; delineation of membrane type and impacts of selection on membrane pressure vessel arrangements; consideration of hybrid configurations; evaluation of feed pump alterations.

19. Dunedin Membrane Performance and Greensand Filter Evaluation, Dunedin, FL. Project manager responsible for the review and evaluation of a membrane softening process using greensand filtration pretreatment. The project included the development of a membrane replacement program and evaluation of preserved and stored membrane elements. Computer modeling and an evaluation of water quality impacts related to the use of brackish and fresh water wells were also performed as part of the study.

20. Alameda County Water District, Fremont, CA. Project Manager. Responsible for performance of a manganese fouling study at ACWD's Newark Brackish Water Desalination Facility Expansion project assessment of manganese in the raw water supply and development of alternative treatment and/or remediation options.

Vulnerability Assessments and Water Security

1. Town of Jupiter Vulnerability Assessment, Jupiter, FL. Project Manager. Scope of services included performing a Vulnerability Assessment of the Town's drinking water facilities. The vulnerability assessment identified system's vulnerabilities and provided a prioritized plan for security upgrades, modifications of operational procedures, and/or policy changes to mitigate identified risks to critical assets.

2. U.S. Navy Guam Water System Vulnerability Assessment, Tamuning, Guam. Project manager. Scope of services included performing a Vulnerability Assessment (VA) of the US Navy Water System on Guam. The work included an assessment of the vulnerabilities of the existing water supply, transmission pipelines, treatment facilities; distribution system; and the risks posed to the surrounding community related to terrorist attacks on the water system.

3. Sarasota County Vulnerability Assessment, Sarasota County, FL. Quality Control. Scope of services included performing a vulnerability assessment and EOP updates for the County.

4. Peace River Manasota Regional Water Supply Authority Vulnerability Assessment, Sarasota, FL. Quality Control. Scope of services included conducting an EPA approved Vulnerability Assessment of the Peace River Authority's regional water supply assets.

5. Santa Clara VWD Security Vulnerability Assessment, Santa Clara, CA. Technical

assistance in a vulnerability assessment that determined critical assets in the District's water system, detailed interrelationships within the system, identified the consequences of malevolent acts that could be directed against them, and evaluated the effectiveness of both existing and proposed protection systems. A prioritized plan was recommended for security upgrades, modifications of operational procedures and policy changes to mitigate identified risks to critical assets. Santa Clara Valley Water District operates 3 reservoirs, 2 water treatment plants, 25 pumping stations, 23 storage tanks, and 700 miles of transmission piping. The system serves 13 retail utilities and 2,000,000 people.

Water Quality and Safe Drinking Water Act Studies

1. Peace River Option Water Quality Master Plan, Peace River, FL. Technical leader for preparing a water quality master plan and performing a treatability evaluation. Project included an evaluation for a 12-mgd coagulation-sedimentation-filtration water treatment plant using aluminum sulfate coagulant. The jar-testing program included evaluation of iron and alum coagulants, polymer coagulant aids, ozone, and granular activated carbon. The plan also included a review of the existing facility operation.

2. Breakpoint Chlorination & Chloramine Study, Pinellas County, Largo, FL. Project manager. Provided professional engineering services related to Tampa Bay Water's conversion of its water supplies to chloramines. In order to prepare for this conversion, Pinellas County Utilities (a consecutive water system of TBW) initiated a breakpoint chlorination and free-chlorine chemical "burn" study. The study would delineate dose ranges for varying hydraulic conditions, identify conditions for di- and tri-chloramine formation, and identify preferred chemicals relative to disinfection and corrosion control.

3. Blending Source Waters in Hanamaulu Water System, Kauai, HI. Project Manager. Scope of services included peer review to blending multiple water qualities into a common distribution system. Historically, the water system was a ground water system, but the new Grove Farm water treatment facility will treat surface water with microfiltration prior to mixing in Kauai's water distribution system. An evaluation as to the impacts on SDWA compliance was conducted as part of this authorization.

4. Review of Total Coliform in Water Distribution System, Pinellas County, FL. Project Manager. Retained by Pinellas County Utilities to provide professional engineering services related to a limited review and evaluation of total coliform occurrences in Pinellas County Utilities' drinking water distribution system. Assisted the county to review the materials of construction of the distribution system, review current operations practices as related to total coliform occurrences, conceptually evaluate operation and maintenance practical used to manage potable water, and identify methods to resolve bacteriological episodes in the system.

5. U.S. Navy Guam Fena Water Treatment Plant Treatability Study, Tamuning, Guam. Project Manager. Retained by the U.S. Navy Public Works Center to assist the US Navy to implement Comprehensive Technical Assistance (CTA) for the Fena Water Treatment Plant in Guam. The CTA, a follow-up to the CPE, assisted in remedying causes of insufficient or poor plant performance of the existing WTP's operation practices to meet current and future requirements of the Safe Drinking Water Act. This component included conducting a treatability study that was comprised of bench scale testing of enhanced coagulation and granular activated carbon. Additional testing conducted at the pilot-scale included membrane

filtration and ultraviolet light disinfection.

6. U.S. Navy Guam Comprehensive Performance Evaluation of the Fena Surface Water Treatment Plant, Marianna Islands, Guam. Project manager and engineer-of-record for a program implemented by the Guam Engineering and Management Division for Public Works Center Utilities of the United States Navy (NAVFACENGCOM Marianas Islands, Contract No. N62766-00-D-0012). Performed a Comprehensive Performance Evaluation (CPE) per USEPA protocols (EPA/525/6-91/027) to identify and address performance-limiting factors at the Fena WTP. The CPE involved the thorough review and analysis of the Fena WTP performance-based capabilities and associated administrative, operation/maintenance practices.

7. NSF International ETV Program Technical Report Review and Quality Control, Ann Arbor, MI. Project manager and technical leader for multiple-contract peer review services related to the USEPA's ETV Verification Program related to field operations documents, verification reports, test plans, protocols and data related to treatment technologies and performance claims. This project included review of four ETV Verification Reports pertaining to membrane technologies. The Reports were provided to NSF International by EPA field testing organizations per the terms of protocols developed for treatment technologies used in packaged and/or modular drinking water treatment systems for small public or private water suppliers. Work encompassed the review of literature related to membrane technologies and comments on the technical integrity of the data and results derived during the testing period.

8. Greater Pine Island SDWA Water Quality Study, Bokeelia, FL. Project manager and technical leader. This project called for an evaluation of the Association's drinking water system and existing desalting process to determine where the system or systems' operations might need to be enhanced relative to existing SDWA requirements or modified to meet anticipated and proposed SDWA requirements. The study included reviews of the water system relative to raw water supply, process control, disinfection practices, and regulated water quality parameters and indicators.

9. Immokalee Water Quality Evaluations, Immokalee, FL. Project engineer for evaluation of iron and color water quality to recommend treatment alternatives and develop an action plan for regulatory compliance. Developed DBP formation curves in support of this study.

10. Lake Worth Safe Drinking Water Act Compliance Evaluation, Lake Worth, FL. Technical leader for an evaluation of water quality to recommend treatment alternatives and develop an action plan for treatment enhancements to an existing 15-MGD lime softening facility. The study included reviews of the water system relative to raw water supply, treatment and distribution system including process control, disinfection practices, and regulated water quality parameters and microbiological indicators.

11. Polk County Consumer Confidence Reports, Bartow, FL. Project manager. Provided professional engineering services related to the development of the County's 1998, 1999 and 2000 Annual Water Quality Reports regarding SDWA's Consumer Confidence Regulations.

12. Polk County Imperiallakes and Turner Road Hydrogen Sulfide Conceptual Treatment Alternatives Evaluation, Winter Haven, FL. Project Manager. Performed a conceptual treatment alternatives evaluation for Jones Edmunds Associates (Tampa, FL) on behalf of Polk County. Project included assessing sulfide removal technologies, providing conceptual opinions

of cost, and recommended an action plan to pilot test two alternatives.

13. Polk County Dinner Lake Hydrogen Sulfide Conceptual Treatment Alternatives Evaluation, Winter Haven, FL. Project Manager. Performed a conceptual treatment alternatives evaluation for Keith and Schnars (Winter Haven, FL) on behalf of Polk County. Project included assessing sulfide removal technologies, providing conceptual opinions of cost, and recommended an action plan for additional monitoring of the well and system.

14. City of Ocoee Initial Distribution System Evaluation, Ocoee, FL. Project Manager. Assisted the City of Ocoee in their performance of an Initial Distribution System Evaluation (IDSE) per the requirements of the SDWA. Assisted the city to develop a Standard Monitoring Plan (SMP) that the city submitted to the Environmental Protection Agency (EPA).

15. Town of Jupiter Initial Distribution System Evaluation, Jupiter, FL. Project Manager. Assisted the Town in their performance of an Initial Distribution System Evaluation (IDSE) per the requirements of the SDWA. Assisted the Town to develop a Standard Monitoring Plan (SMP) that the Town submitted to the Environmental Protection Agency (EPA).

Design Peer Reviews and Value Analysis Projects

1. Boca Raton 40-MGD Membrane Softening Plant Value Analysis, Boca Raton, FL. Project engineer responsible for performing value analysis related to the design of a 40-MGD membrane softening (nanofiltration) WTP. The value analysis services included review of 30% and 60% design drawings, specifications documents, ancillary facilities and participation in interdisciplinary workshops. Developed cost savings documentation and criteria.

2. Peer Review of ROWTP-WQ Specifications, Clearwater, FL. Project Manager. Scope of services included quality assurance and quality control reviews of Request for Proposal Specifications for a drinking water improvements project performed by the City of Clearwater Public Utilities Department. The City of Clearwater prepared a membrane system equipment specification (13025-1) for membrane system equipment relative to their implementation of a reverse osmosis water treatment project.

3. Irvine Ranch Water District Irvine Desalter Project Peer Review and Value Analysis Assistance, Irvine, CA. Project Manager for peer review and value analysis services for IRWD's Irvine Desalter Project (IDP). The IDP will treat three separate ground water sources with three reverse osmosis production facilities having a combined permeate capacity of 8.7 MGD. The design review was performed at 30% and 60% design level and included the evaluation of pilot plant testing results. Approximately \$3 million worth of savings were identified as a result of the peer review effort.

4. Peer Review of El Paso Eastside Desalting WTP, El Paso, TX. This project consisted of providing the consulting firm Parsons and El Paso Utilities on-site peer review professional engineering services related to the City of El Paso (Texas) proposed Eastside desalination facility designed by others. The review of the 30 percent design drawings and associated reports included process engineering reviews, compilation and evaluations, preparation of written descriptions, analyzed alternatives, identified value engineering concepts, responded to verbal requests and participated in two workshops with the client and designed engineer-on-site at the City of El Paso Water Utilities facilities.

5. Reverse Osmosis Mixed Bed Filter Process Peer Review, Manitowoc, WI. Project Manager. Retained by Manitowoc Public Utilities to provide a peer review of specifications and design criteria for a 900 psig and 1500 psig boiler make-up water treatment process consisting of reverse osmosis and mixed bed filters.

6. Wadi Ma'in Jordan Desalting WTP Peer Review, North Brunswick, NJ.

Project Manager. Provided professional engineering services peer review consulting services to review design-bid-build documents related to ABB Susa, Inc.'s bid submittal for the Wadi Ma'in Jordan Desalting Plant.

Other Water Treatment Plant Design Experience

1. City of Oviedo Mitchell Hammock Water Treatment Facility, Oviedo, FL. Project Director and Principal-in-Charge for a program to develop the City's new water treatment plant. Project included site selection, piloting, permitting, preliminary and final design, bidding, construction phase services, start-up, training and warranty phase services relative to the City's new 10-mgd Mitchell Hammock Water Treatment Facility. The facility was designed to treat ground water containing hydrogen sulfide using a forced-draft aeration process. The facility was master planned for a future expansion (up to 16-mgd) that includes the addition of nanofiltration membranes for carbon and hardness removal. Construction phase services included value-engineering activities.

2. Pinellas County Utilities Water Blending Facility, Clearwater, FL. Project manager for investigation and preliminary design of a 100-MGD water blending facility to chemically condition variable mixtures of desalinated seawater, groundwater and surface water delivered by Tampa Bay Water. Project also included development of an on-line water quality monitoring system and jar testing for disinfection and corrosion control using electrochemical noise technologies.

Other Miscellaneous Experience

Pinellas County Phase I: Conceptual Water Quality Impacts and Master Planning, Clearwater, FL. This project involved engineering services related to performing a conceptual water quality impacts study. Potential impacts were characterized by individual regulation, aesthetics, compatibility with the overall system, relative probability of occurrence and public health risk. In particular, corrosion control, disinfection, biostability and iron re-equilibration and release were emphasized as key areas of concern in the County's aged and mature ground water system. Recommendations were tailored to mitigate projected impacts of utilizing a variable blend of treated ground, surface and desalted water supplies via interim chemical feed facilities, blending and detention and/or advanced treatment.

Polk County Water Quality Master Plan, Polk County, FL. Project manager and technical leader to study several drinking water systems. Services included assessing the County's public water systems based on SDWA requirements and establishing priorities for improvements to the County's water treatment facilities located in the northeast/northwest service areas.

Online Analyzer Design, Pinellas County, FL. Project Manager. Scope of services included providing assistance to implement online water quality monitoring in the Pinellas County water distribution system. This is the result of recommendations presented in the Pinellas County

Utilities Distribution System Operation and Maintenance Practices report where online monitoring was identified as an integral part of the County's preparations for scheduled changeover from free chlorine to chloramines in May 2002.

Marco Island Integrated Membrane WTP Site Selection, Marco Island, FL. Project manager for site evaluation for proposed water treatment plant. Services included site and systems evaluations related to a new water treatment plant. Developed criteria to be used to identify land sites for locating a membrane process drinking water treatment plant in support of Florida Water's long-range water system master plan. Also, project manager for an evaluation of integrated membrane systems (MF, UF, NF, RO) to treat Marco Lakes raw water supply water through the use of pilot-scale equipment located at the Marco Island lime softening WTP.

Peace River Option T. Mabry Carlton Jr. EDR Water Quality Compatibility Evaluation, Sarasota, FL. Engineer-of-record to compare and evaluate the compatibility and chemistry of blending 6 MGD of surface water treated at the Peace River alum coagulation surface water treatment plant and 12 MGD of EDR product water produced at Sarasota County's EDR plant through an interconnection between the two water purveyors. Project included analyzing historical data, water quality sampling and reporting, computer modeling, bench studies, cost estimating and recommending modifications to the existing infrastructure.

City of Dunedin TTHM/Blending Demonstration, Dunedin, FL. Project Manager. Scope of services included assistance during the Owner's implementation of a limited project that will assess the raw water bypass to permeated blending ratios at the Owner's membrane softening water treatment plant in an effort to decrease the TTHM in the distribution system. The purpose of the bypass water is to provide stability (via alkalinity recovery) for corrosion control.

Jupiter Lime Softening Plant Evaluation, Jupiter, FL. Project manager for a project to evaluate enhancement methods to chemical treatment for increasing removal of disinfection by-product precursor material, non-purgeable dissolved organic carbon (DOC), including cost estimates for options explored using jar testing methodologies.

Blending of NF Concentrate with Reclaimed Water, Jupiter, FL. Project Manager. Scope of services included of performing an engineering study that evaluated blending NF process concentrate water with reclaimed water.

Interim Treatment Facility Design and Distribution System O&M Practices Evaluation, Clearwater, FL. Project Manager. Services to Tampa Bay Water's conversion of its water supplies to chloramines. Provided preliminary engineering design services relative to interim chemical feed treatment facilities.

Fena Water Treatment Plant - MILCON Evaluation, Tamuning, Guam.

Project Manager. The U.S. Navy Public Works Center requested a Comprehensive Technical Assistance (CTA) for the Fena Water Treatment Plant in Guam. The CTA assisted in remedying causes of insufficient or poor plant performance of the existing WTP's operation practices to meet current and future requirements of the SDWA. This component of work focused on the analysis of the suitability of previously recommended MILCON facility upgrades as related to bypass, source water and regulations. The task developed design criteria, concept design schematics and conceptual opinions of probable construction costs.

Barefoot Bay Water System Bond Compliance, Brevard County, FL. Technical leader for general system compliance evaluation with respect to the bond covenant requirements. Services include review of the Capital Improvement Plan for the year 2000, review operations and maintenance activities for the year 2000. Based on information collected, the renewal and replacement fund was reviewed and recommendations made as to the status of that fund and verify financial bond covenant compliance.

Barefoot Bay Water Treatment Plant THM Compliance, Brevard County, FL. Technical leader. This project included professional services in connection with reviewing the existing THM problem and identifying potential solutions and costs. The plant had experienced high levels of THMs and was in violation of state standards. The short-term actions converting to chloramines resulted in an effective drop in THMs that met the state and federal requirements. Long-term recommendations included partial membrane treatment and blending was the selected option.

Lake Marianna Ion Exchange Waste Stream Evaluation, Polk County, FL. Project manager and technical leader for engineering analysis to determine the impact of discharge from an ion exchange process on a wastewater treatment plant process at the Lake Marianna Water Production Facility.

Marco Shores Lime Softening Plant, Marco Island, FL. Project manager. This project included professional engineering services in connection with the design of ammonia storage and feed facilities for the Marco Shores LSWTP.

NSF International ETV Program Technical Reviewer and Quality Control, Ann Arbor, MI. Project manager and technical leader for multiple-contract peer review services related to the USEPA's ETV Verification Program related to field operations documents, verification reports, test plans, protocols and data related to treatment technologies and performance claims.

NSF International Ion Exchange Nitrate Removal Test Plan, Ann Arbor, MI. Project manager and technical leader for review and revision of the testing protocol and test plans for nitrate removal by ion exchange treatment technologies using in packaged and/or modular drinking water systems for small public or private water suppliers.

NSF International Ozone Microbial/Synthetic Organic Chemicals Test Plan Review, Ann Arbor, MI. Project manager and technical leader for peer review services. The project included providing professional and technical peer review of the draft documents test plan for removal of synthetic organic chemicals and microbiological inactivation by ozone technologies related to the USEPA's Equipment Technology Verification Program Program.

NSF International VOC Air Stripping Test Plan and Protocol. Project manager. Provided technical peer review of the draft document "Volatile Organic Compound (VOC) Test Plan and Protocol for Removal of Volatile Organic Compounds by Air Stripping Technologies" in support of USEPA's Equipment Technology Verification Program.

Orange County Eastern Regional Water Supply Facility, Orlando, FL. Project engineer responsible for a conceptual treatment alternative study and master site development plan. Overall project included preliminary and final design, bidding, and construction-phase services for a new \$26 million, 20-mgd water treatment plant including process, permitting, quality

control, structural, electrical, mechanical, and instrumentation services. This assignment also included the design of a 31,000- square-foot operations center.

Distribution System WQ Operations Study, Tampa, FL. Provided professional engineering services related to Tampa Bay Water's conversion of its water supplies to chloramines. Specialized services focused on assisting the County with developing strategies for understanding water quality changes in the transmission system, establishing water quality goals and preliminary performance objectives, alternatives evaluation, implementation of good management practices, monitoring effectiveness, developing long-term performance standards and standard operating procedures, and associated infrastructure improvements.

Marco Shores Lime Softening Plant, Marco Island, FL. Project manager for the design of ammonia storage and feed facilities for the Marco Shores Lime Softening Plant.

Packed-Tower Aeration Pilot Plant Evaluation, Fort Myers, FL. Operated, evaluated and modeled mass transfer in an air-stripping WTP pilot plant for THM removal from a water supply for soft drink beverage processing.

Groundwater Quality and Nanofiltration Cost Analysis, Olympia, WA. As project manager, evaluated groundwater quality and prepared preliminary design and cost estimate for a 1.0-mgd nanofiltration process to reduce fouling in condenser tubes for a brewery facility.

Bioassay Toxicity Evaluation for Wastewater Effluent, Altamonte Springs, FL. As project engineer, investigated and evaluated water quality and NPDES bioassay data to determine causes for *Ceriodaphnia dubia* toxicity from an advanced wastewater treatment plant. Project involved evaluating various conceptual alternatives to mitigate the city's current NPDES effluent toxicity problems.

Polk County Utilities Wastewater Monitoring Well Sampling, Bartow, FL. Project manager. Provided professional engineering services related to the coordination of wastewater monitoring well sampling at approximately 70 monitoring wells within Polk County for calendar years 1999, 2000 and 2001.

Comprehensive Performance Plan Agana & Northern District Sewage Treatment Plants, Tamuning, Guam. Project Manager. This project consists of conducting a Comprehensive Performance Evaluation (CPE) for the Agana & Northern District Sewage Treatment Plants as a subconsultant to Duenas and Associates. The CPE was for the Agana sewage treatment plant including ancillary facilities that provide pretreatment at a remote location (Agana Main Sewage Pump Station). The ASTP had not consistently met the effluent set by the US EPA in GWA's permit under the National Pollutant Discharge Elimination System.

Combeewoods Wastewater Treatment Facility, Polk County, FL. Project manager. This project consisted of conducting an evaluation included a site visit to measure and photograph the treatment components, with treatment equipment having been evaluated against current design standards. The task resulted in the preparation of an O&M Performance Evaluation Report on overall and individual unit process effectiveness in meeting permit conditions.

Receiving Water Body Evaluation, Altamonte Springs, FL. Project engineer responsible for investigating and mathematically modeling chlorine uptake kinetics in the Little Wekiva River.

Dunedin Capacity Analysis Report, Dunedin, FL. Project engineer that prepared a capacity analysis report for a 6.0-mgd A2/0 advanced WWTP.

Water Quality Specialist for Zebra Mussel Control Design, Milwaukee, WI. Project manager for the evaluation of disinfection by-products and modeled chlorine dissipation for a 365-mgd surface water filtration plant for design criteria of chemical feed facility.

Water Supply and Chemical Treatment Evaluation, Oshkosh, WI. Project engineer for a water supply and chemical treatment evaluation for zebra mussel control pretreatment options and Safe Drinking Water Act requirements for a 15-mgd surface water filtration plant.

Water Treatment Plant Evaluation, West Virginia Turnpike, WV. Project engineer for the evaluation disinfection by-products, priority pollutants, and inorganic water quality for the design of two potable water treatment plants requiring iron and manganese removal.

Industrial Chemical Facility Review. Determined incompatible material reactivity hazards and evaluated chemical handling for a large industrial production facility in Northern Michigan.

Waste Minimization Guide Development. Prepared a hazardous waste minimization self assessment guide for the State of Wisconsin Vocational Institution, Colleges and Universities.

Laboratory Review and Evaluations. Supervised projects, performed chemical analysis, interpreted data, and managed pilot evaluations in the Priority Pollutants Laboratory in the Environmental Systems Engineering Institute at the University of Central Florida.

Laboratory Analytical/Field Procedures, Orange County, FL. Provided recommendations to improve chemistry and biology methods, estuary sample techniques, aquatic plant maintenance practices, sludge disposal operations and industrial inspections.

Florida Dept of Agriculture & Consumer Services Lab Analytical Procedures, Tallahassee, FL. Operated, maintained, and optimized lab analytical procedures for evaluation of food materials: atomic absorption and ultraviolet spectrophotometry, gas chromatography, high-performance liquid chromatography, spectrofluorometry, and flow-injection analysis.