

# High Purity Water Treatment Qualifications

of Michael Bukay, M.S.  
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## DEIONIZED (DI) WATER HANDS-ON EXPERIENCE

Conducted DI Water troubleshooting at:

- Bristol Labs, Electric Power Research Institute (EPRI), Pfizer, Genentech, Fujitsu, Kodak, Monsanto, General Instruments, Hewlett Packard, IBM, Data General, International Rectifier, Bendix, INMOS, Intel, Delco, Allied Signal, Advanced Micro Devices, Siliconix, Synertek, General Electric, Signetics, Northern Telecom, Miller Western, New United Motor Manufacturing Inc., and others.
- Supervised DI Water equipment start-up for many of the above companies.
- Developed cost & resource analysis spreadsheets for Hewlett Packard.

## SOFTWARE DEVELOPMENT

- President and co-founder of Westwind Software, Inc. Co-developed the Water System Detective™ software for Windows. The software is used in the start-up monitoring and optimization of water treatment systems.

## TRAINING EXPERIENCE

- Developed a 36 hour DI water training program for operators and has provided operator training to Syntex, Genentech, Shell, Amoco, Mobil, IBM, 3M, Nalco, Betz, Drew, Dow, Glegg, Goodyear, PG&E, DuPont, Westinghouse, IBM, Xerox, Kodak, Sybron, Ontario Hydro, AT&T, Air Products, Intel, Sony, Advanced Micro Devices, Motorola, National Semiconductor, Rockwell International, Arrowhead, Polymetrics, Ionics, US Filter and numerous other companies.
- Taught reverse osmosis fundamentals and troubleshooting techniques at the annual Ultrapure Water and Watertech conferences for over 20 years.
- Co-developed with Reinhard Hanselka, 8 training modules for the Pipe Trades Training Center Local 393 in San Jose, CA for the apprentice training program for the pipefitting industry.
- Taught introductory and advanced classes on the operation and maintenance of high purity water systems at West Valley College in Silicon Valley.
- Was responsible for managing the technical content of the series of seminars "Fundamentals of High Purity Water Systems" sponsored by Ultrapure Water journal.
- Designed and managed a DI Water seminar titled "How to Maintain and Troubleshoot High Purity Water Systems," for Aqua Media.
- Trained field service engineers, consultants, and sales engineers on the operation and maintenance of Aqua Media RO/DI Equipment.

## PUBLICATIONS

- Authored over 25 published articles on water treatment.
- Wrote a DI Water troubleshooting column called "Information Exchange" for Ultrapure Water journal from 1984 to 1986.

## Technical Publications

of Michael Bukay, M.S.

1. Bukay, Michael, Information Exchange #1: "How to Monitor a Reverse Osmosis System," Ultrapure Water, Vol. 1, No. 2, pp. 32-36, Sep./Oct., 1984.
2. Bukay, Michael, Information Exchange #2: "How to Monitor Ion Exchange Efficiency," Ultrapure Water, Vol. 1, No. 3, pp. 36-41, Nov./Dec., 1984.
3. Bukay, Michael, Information Exchange #3: "Bacteria Control in Reverse Osmosis Systems: Five Case Histories," Ultrapure Water, Vol. 2, No.1, pp. 43-45, Jan./Feb., 1985.
4. Bukay, Michael, Information Exchange #4: "Tips From Our Readers," Ultrapure Water, Vol. 2, No. 2, pp. 43-46, Mar./Apr., 1985.
5. Bukay, Michael, Information Exchange #5: "How to Insure Proper Resin Separation in Mixed-bed Deionizers," Ultrapure Water, Vol. 2, No. 3, pp. 46-50, May/June, 1985.
6. Bukay, Michael, Information Exchange #6: "Contributions From Our Readers," Ultrapure Water, Vol. 2, No. 4, pp. 44-46, Jul./Aug., 1985.
7. Bukay, Michael, Information Exchange #7: "Case Histories and Horror Stories," Ultrapure Water, Vol. 2, No. 5, pp. 51-57, Sep./Oct., 1985.
8. Bukay, Michael, Information Exchange #8: "Contributions From Our Readers," Ultrapure Water, Vol. 2, No. 6, pp. 49-53, Nov./Dec., 1985.
9. Bukay, Michael, Information Exchange #9: "System Design: Which Arrangement is Better?," Ultrapure Water, Vol. 3, No. 1, pp. 55-57, Jan./Feb., 1986.
10. Byrne, Wes, and Bukay, Michael, Information Exchange #10: "RO Troubleshooting, Part 1: Isolating the Location of a Decline in Salt Rejection," Ultrapure Water, Vol. 3, No. 2, pp. 58-62, Mar./Apr., 1986.
11. Byrne, Wes, and Bukay, Michael, Information Exchange #11: "RO Troubleshooting, Part 2: Causes and Prevention of Front-end Salt Rejection Decline," Ultrapure Water, Vol. 3, No.3, pp 59-62, May/June, 1986.
12. Byrne, Wes, and Bukay, Michael, Information Exchange #12: "RO Troubleshooting, Part 3: Causes and Prevention of Tail-end Salt Rejection Decline," Ultrapure Water, Vol. 3, No.3, July/Aug., 1986.
13. Bukay, Michael, "Problem-free DI Water," Bay Area Contamination Control Association Newsletter, March/April, 1986.
14. Byrne, Wes, and Bukay, Michael, Information Exchange #13: "RO Troubleshooting, Part 4: Causes and Prevention of Isolated and Uniform Salt Rejection Decline," Ultrapure Water, Vol. 3, No.4, Sept./Oct., 1986.
15. Byrne, Wes, and Bukay, Michael, Information Exchange #14: "RO Troubleshooting, Part 4: Causes and Prevention of an Increase in Differential Pressure," Ultrapure Water, Vol. 3, No.5, Nov./Dec., 1986.
16. Hanselka, Reinhard, and Bukay, Michael, "Materials of Construction for Water Systems Part 1: Physical and Chemical Properties of Plastics," Ultrapure Water, pp 46 - 50, Jul./Aug., 1987.
17. Hanselka, Reinhard, Reinzuch, Karl, and Bukay, Michael, "Materials of Construction for Water Systems Part 2: Real Life Failure Modes of Plastics," Ultrapure Water, pp 50 - 53, Sep., 1987.
18. Hanselka, Reinhard, Williams, Ralph, and Bukay, Michael, "Materials of Construction for Water Systems Part 3: Proper Selection of Elastomers," Ultrapure Water, pp 52 - 54, Nov., 1987.
19. Bukay, M., Editor, National Water News, the newsletter of cooling tower ozonation, 1987-1991.

20. Bukay, Michael, H. McPherson, and J. Leet, "The Basics of Monitoring Reverse Osmosis Systems-Part I," Ultrapure Water, Vol. 9, No. 7, 1992, pp 58 - 66.
21. McPherson, Hob, J. Leet, and M. Bukay, "RO Monitoring Part II: Harnessing the Power of Personal Computers," Ultrapure Water, Vol. 10, No.2, 1993, pp 12-18.
22. Nickerson, Glen, B. McClain, and M. Bukay, "Investigation of Severe Flux Decline in a 2-pass CA/TFC RO System," in press, presented at the Ultrapure Water Expo, May 9-11, 1994, Philadelphia, PA..
23. Bukay, Michael, and D. Youngberg, "Improving the Efficiency of High Purity Water Systems," presented at the Ultrapure Water Expo, May 9-11, 1994, Philadelphia, PA.
24. LaFirenza, Steve, J. Neto, and M. Bukay, "Improved UPW Monitoring at Hewlett-Packard by Using a Mobile Barcode Data Collection System," Ultrapure Water, Vol. 15, No.2, 1998.
25. 25. Ron Alexander, and M. Bukay, "Data Management System Enhances Water Treatment Monitoring and Control," Power Engineering, Vol. 104, No. 1, Jan., 2000, pp 44-48.
26. Kohlman, Richard, and M. Bukay, PWR LLW Test Facility: Interim Report on RO Optimization, Electric Power Research Institute (EPRI), Palo Alto, CA., Nov., 2000, Technical Report # 1000848.