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50th ANNIVERSARY

ENVIRONMENTAL ENGINEER

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ENVIRONMENTAL ENGINEER

Cover photo courtesy of CDM, 2005 Operations/Management Grand Prize Winner in the 2005 Excellence in Environmental Engineering Competition (page 20)

BY TIMOTHY G. SHEA, PH.D., P.E., DEE

GIVE US A CALL

We invite you to ask us at any time what we are doing, tell us your views, share your thinking and support for the Academy.

THIS IS A TIME OF REFLECTION AND CHANGE IN THE ACADEMY, and we your officers would like to hear from you! We have set in motion a number of programs that will alter fundamentally the course of the Academy over the next decade. These changes will be discussed at length in our April Board of Trustees Meeting in Washington, DC, culminating in the Awards Luncheon on April 14, and will include: new membership categories to grow our organization; recruiting programs seeking to bring new talent and ideas to our committees; internationalization of the Excellence in Environmental Engineering Awards program, bringing greater recognition to our participants in the international arena; and eminence program honoring those accomplished individuals in our field; and new bylaws, policies and procedures to cast order into our organization for the future.

This groundwork is being done for you, our members, to ensure that the Academy is a viable organization five, ten and twenty years from this point in time, our 50th Anniversary year. This year, our 50th Anniversary Dinner will be held during WEFTEC.05, on November 2, 2005. We hope to see many of you then.

Now to the point! We would like to hear from each of you. We invite you to ask us at any time what we are doing, tell us your views, share your thinking and support for the Academy with potential members, and help us make the Academy a more meaningful element of your professional career. We need fresh ideas and a good read on the outside world that we can only sample to a limited extent. We hear from some of you during the annual election process. To get to know more of you in a social sense, and through such exchange to learn what you want from us, our officers and Executive Director have attended an average of two meetings monthly. We do not have a travel budget so these opportunities are coincidental to the work and other travel duties of our officers.

Even with these limitations we will see you at meetings in over 15 states in 2005 alone. These meetings in each and every case involve our Sponsoring Organizations, including WEF, ASCE, and AWWA. This program has been a great start in hearing from the membership-and pleasurable for all of us.

This still leaves a number of you out of the loop and with valuable ideas that we want to hear. So please send any of us an e-mail or call me directly. We are all in the 'blue book' that is my most useful reference, bar none. We need and ask for your input.

GIVE US A CALL! A

ENVIRONMENTAL ENGINEER

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NEW LAYOUT FOR THE MAGAZINE

YOU MAY HAVE NOTICED that the *Environmental Engineer* has a new look this issue. While the content of the Magazine remains the same, we have updated our fonts and graphics to make the magazine easier to read and look crisp and fresh.

We hope you like the new look and welcome your comments.

ACADEMY RECOGNIZES THREE AWARD HONOREES

At the Academy's Awards Luncheon on April 14th at the National Press Club in Washington, DC, three Honorees were recognized for their contributions to the Academy and the Environmental Engineering profession.

JAMES E. FOXWORTHY, PH.D., P.E., DEE was the recipient of the Edward J. Cleary Award. The Cleary award is given biennially to an individual who is an outstanding performer in the management of environmental protection enterprises conducted under either public or private auspices who have demonstrated exemplary professional conduct, personal leadership, originality in devising new environmental protection techniques and sensitivity and responsiveness to social, economic and political factors in environmental protection.

ROBERT C. MARINI, P.E., DEE received the Gordon Maskew Fair Award. The Fair Award is given annually to those recognized as having contributed substantially to the status of the environmental engineering profession and to the Academy by: exemplary professional conduct, recognized engineering achievements and significant contributions to the control of the quality of the world's environment.

H. LANIER "LANNY" HICKMAN, JR., P.E., DEE was presented with the Stanley E. Kappe Award. Those receiving the Kappe award have performed extraordinary and outstanding service contributory to significant advancement of public awareness to the betterment of the total environment and other objectives of the Academy.

Congratulations to our 2005 Honorees.

AAEE 50TH ANNIVERSARY CELEBRATION

Mark Your Calendars

AAEE will officially celebrate our 50 years of service to the Environmental Engineering profession at a Gala Banquet on Wednesday, November 2nd in Washington, DC. The event is scheduled to coincide with the final day of the 2005 WEFTEC Conference so as to make it easy for as many Diplomates and Academy supporters to attend.

As plans firm up over the next few months, we will be sending more detailed information about the Banquet to all AAEE members. In the mean time, save the date and we hope to see you there.

ACADEMY MEMBERSHIP CONTINUES TO GROW

With the 2005 renewals just about all in and applications for Certification Exams coming in strong right now, it is clear that interest in the Academy is growing.

Currently we have 2,300 Diplomate Environmental Engineers in our roles. We also have approximately 300 Intern and Associate Environmental Engineers working their way toward certification. This is the largest number of Diplomates the Academy has seen since 1996, and applications for the class of 2005 continue to come into the office.

We would like to thank all of our individual members, our Professional Development Partners and other firms who encourage their engineers to seek Board Certification through the Academy. The more Board Certified Environmental Engineers that are out there, the more widely known the Academy will become, strengthening the cause for Specialty Certification throughout the industry.

Keep up the good work.

BY DEBRA R. REINHART, PH.D., P.E., DEE

DIVERSITY IN SCIENCE & ENGINEERING

I believe the science and engineering professions with low female and minority representation need to better communicate to the public their human side.

ON JANUARY 14, LAWRENCE SUMMERS, PRESIDENT OF HARVARD UNIVERSITY, spoke at a private meeting of the National Bureau of Economic Research on diversifying the science and engineering workforce where he shared his hypotheses as to why women were underrepresented at higher ranks in science and engineering. First, he suggested that married men were willing and able to put in the 80 plus hours per week he thought necessary to reach these levels, unlike married women. Second, he observed that by high school boys tended to outperform girls on math and science standardized tests and that there may be "innate differences" in the natural abilities of girls and boys in these areas. Finally, he speculated that these differences were reinforced by socialization and discrimination. In his defense, he said that the intent of his comments was to be provocative and he repeatedly stated that he could be wrong and hoped he was.

The resulting brouhaha in the national press and at Harvard University over Dr. Summers' comments demonstrated the depth of feelings in our society over comments like these. I imagine Dr. Summers wishes he had remained quiet.

Dr. Summers based his conclusions on research presented at the conference. This research also showed that girls perform better than boys on standardized testing conducted during elementary school. What happens in middle and high school to discourage girls in math and science is a subject of much research and debate.

As a side note, and perhaps of interest to AAEE Diplomates, Dr. Summers is not new to controversy. On December 12, 1991, while at the World Bank, he reportedly wrote an internal memo that was leaked by environmental groups in 1992. In this memo, he queried "shouldn't the WB be encouraging more migration of dirty industries to LDC (less developed countries)?" He supported this notion with three thoughts: (1) the cost of environmental pollution is a function of foregone earnings due to health issues or death; LDCs have low wages, therefore they will experience lower economic impact; (2) the least cost of pollution occurs during the initial incremental increase in contamination; LDCs are under-polluted and therefore would have the greatest capacity to absorb pollution; and (3) because much of the concern over pollution is aesthetic, LDCs will experience greater economic benefit from bringing industry to their countries than any loss associated with pollution.

The American Society of Engineering Educators noted that in 2003-2004 more than 42% of the BS degrees in environmental engineering were awarded to women. Women are similarly represented in environmental graduate programs and in the profession overall. (Unfortunately, AAEE is woefully underrepresented by women and other minorities.) Contrast these figures with mechanical engineering where female engineering graduates constituted 13% of those awarded degrees; computer engineering 12.8%; and electrical engineering 16.1%. We also see many impressive women leaders in environmental engineering. Jeanette Brown, our immediate past president, is a great example.

What does all this say about environmental engineering? To me it suggests that men AND women are willing to put in the hours necessary to succeed in a profession that they see directly serves society, that women are encouraged to enter environmental engineering, and that there are no "innate differences" in the ability of men or women to excel in our field.

I believe the science and engineering professions with low female and minority representation need to better communicate to the public their human side. Lawyers and doctors have successfully reached gender balance through just this approach.

Of course, I could be wrong – and I am trying to be provocative. A

DANNY D. REIBLE, PH.D., P.E., DEE, has been elected as one of 74 new members and associates of the National Academy of Engineering. Dr. Reible is a Diplomate Emeritus and is certified in Water Supply and Wastewater.

RICHARD R. ROLL, P.E., DEE, has been appointed to the position of Director of Technical and Regulatory Services. Mr. Roll has been a Diplomate since 1992 and is certified in Water Supply and Wastewater.

KENNETH E. WILSON, P.E., DEE, has been named to AWWA's National Standards Council. Mr. Wilson has been a Diplomate since 2002 and is certified in Water Supply and Wastewater.

IN MEMORIAM

ROBERT G. CLARK, P.E., DEE, passed away on January 30, 2005. He was certified in 1979 in Radiation Protection.

N. SINGH DHILLON, P.E., DEE, passed away on February 14, 2005. He was certified in 1968 in Sanitary Engineering.

CLARENCE A. MAGNUSEN, P.E., DEE, passed away earlier this year. He was certified in 1972 in Sanitary Engineering.

JOHN T. RHETT, P.E., DEE, passed away on January 15, 2005. He was certified in 1976 in Water Supply and Wastewater.

LETTER TO THE EDITOR

Dear Sir:

I WAS EXTREMELY SURPRISED TO read the article in the Fall 2004 *Environmental Engineer* by Dr. C. Joseph Touhill entitled "Who is the First Environmental Engineer?" I graduated from Rensselaer Polytechnic Institute in June 1956 with a B.C.E. and my option was Sanitary Engineering. There were about five or six of us in that group. As far as I know, only one other member is also a Diplomate (Retired): Paul Kilian.

I had started in Rensselaer in September 1952 as a Mechanical Engineer but soon realized that area of engineering was not for me. I spoke to various people in the Civil Engineering Department, and Dr. Edward Kilcawley convinced me that I should take CE with the Sanitary Engineering option. It was the smartest move since I eventually spent more than three decades designing and/or managing potable water projects both in the United States and posted abroad.

As I think back almost fifty years ago, I was under the impression that the members of the Class of 1957, the class after us, were the last group to have the Sanitary Engineering option within the Civil Engineering curriculum at Rensselaer. But I was not there after 1956 to fully realize what was happening. I was under the understanding that Rensselaer was moving to an inter-departmental program of Environmental Engineering sometime after I received my undergraduate degree. One of the other reasons for this change, as I think back, could have been that the Federal Government was coming out with programs to pay or support personnel to get an Environmental Engineering degree.

Our group, although having studies in other related "sanitary" areas, and courses which concentrated more on the water and wastewater aspects of engineering. This is why I always referred to myself as a "Sanitary Engineer" and not an "Environmental Engineer". The latter, I felt, was more associated with public health aspects than the area in which I worked. But most engineering firms, dealing primarily in water and wastewater, now seem to refer to their work and/or department as Environmental, and not Sanitary, Engineering.

This article brings back many names from the past. I especially remember Professors Munzer and Kelleher who taught most of our "Sanitary" courses, as well as the Head of the Civil Engineering Department, Admiral Lewis B. Combs. There were, as I recall, six Civil Engineering graduates in June 1956 who were commissioned in the U.S. Navy on graduation day. Admiral Combs was unable to get even one of these new Ensigns into the Navy's Civil Engineering Corps. I guess that I should be glad since my career would never have taken many of the twists and turns that it did take, all to the better.

Thanks to Dr. Touhill for the many memories of the happy days in the Troy Building and our Civil Engineering classes.

John H. Cunningham, Jr., P.E., DEE (Ret)

OFFICER NOMINEES FOR 2006

The Academy's Nominating Committee is chaired by Past President, Jeanette A. Brown. It's members include Raymond C. Loehr, Keith E. Carns, Robert P. Gardner, Debra R. Reinhart, and H. Lanier Hickman, Jr. The committee recommends the following slate of candidates:

President-Elect	**Stephen R. Kellogg**
Vice President	**William P. Dee**
	Cecil Lue-Hing
Trustee-at-Large	**Gary S. Logsdon**
	Robert C. Williams
	Rajendra P. Bhattarai
	John D. Booth
	James T. Canaday
	David A. Dzomback
	LeRoy C. Feusner
	Sandra L. Tripp

PRESIDENT-ELECT

STEPHEN R. KELLOGG has more than 30 years of experience in environmental engineering. He received a B.S. in Civil and Environmental Engineering from the University of Massachusetts in 1972, and an M.S. from Cornell University with a minor in Business Administration in 1974. Upon graduating, he joined the firm of Roy F. Weston in West Chester, Pennsylvania.

In 1979, Mr. Kellogg formed his own consulting firm, YWC, Inc, which focused on engineering, operations and maintenance, laboratory, remediation, and mobile sludge processing services. Mr. Kellogg grew the firm to more than 400 employees. In 1986, YWC, Inc. was recognized by Inc magazine as the 147th fastest-growing privately held company in the United States, and the 2nd fastest-growing environmental services firm.

Currently, Mr. Kellogg is employed as a Senior Vice President for CDM. Mr. Kellogg manages the firm's operations and maintenance services throughout the United States and internationally.

Mr. Kellogg became a Diplomate in January 1983 serving as Chair of the Membership Committee from 1989 through 1991, and State Representative for Connecticut and Rhode Island from 1991 to the present. Recently, Mr. Kellogg was elected Vice President of the Academy after serving on AAEE's Board of Trustees.

Mr. Kellogg is a member of numerous professional organizations, including the American Society of Civil Engineers, American Water Works Association, National Society of Professional Engineers, Water Environment Federation.

Personally, Mr. Kellogg is married with four children and lives in Stratford, Connecticut. He is very involved in education and serves on two advisory boards at the University of Massachusetts. He funds two Kellogg Scholarships for undergraduates at the university, and recently contributed funds for the Kellogg Conference Center at the university's 60,000-square-foot Engineering Laboratory II Building.

As AAEE President Elect, Mr. Kellogg will remain deeply committed to follow through, focusing on the importance of environmental engineers being board certified. He will also focus upon promoting board certification in the external market place.

VICE PRESIDENT

WILLIAM P. DEE received his B.S. in Civil Engineering (1970) and M.S. in Environmental Engineering (1972) from Manhattan College. He joined Malcolm Pirnie, Inc. as an entry level engineer in 1970 in White Plains, New York and has risen through the ranks of that organization to become its President and CEO.

Early in his career, Mr. Dee specialized in industrial wastewater treatment and was involved in projects for the pulp and paper industry. His areas of expertise include process design, detailed civil/environmental design, construction administration, and start up/operations. He later transitioned to serving the municipal sector where he was responsible for significant wastewater projects involving innovative treatment technologies and complex solids handling facilities. Mr. Dee also was responsible for a variety of environmental projects which involved solid waste disposal and hazardous waste remediation.

Mr. Dee is a registered engineer in six states and has been a Diplomate since 1988. He has served as the Academy's State Representative for Ohio and has been involved with the Excellence in Environmental Engineering Awards Committee since 1994, becoming Chair in 1999. He won the AAEE Stanley E. Kappe Award in 2001 for extraordinary and outstanding service contributions to the advancement of Academy objectives.

Mr. Dee is active member of several professional environmental organizations including the Water Environment Foundation, American Water Works Association and the International Water Association. He is also on the Board of Directors for the National Action Council for Minorities in Engineering (NACME) which is dedicated to improving the representation of minorities in engineering.

CECIL LUE-HING is the former Director of Research and Development of the Metropolitan Water Reclamation District of Greater Chicago (District), a position he occupied between 1971 and 1999. He currently operates as a private practitioner environmental consultant as President of Cecil Lue-Hing, and Associates Inc., a sole proprietorship Chicago-based Illinois Corporation. Prior to Chicago, he was a Vice President of Ryckman, Edgerley, Tomlinson and Associates, an environmental consulting firm in St. Louis Missouri. Cecil has earned degrees from Marquette, Case Western Reserve, and Washington University in St. Louis, in Civil, and Environmental & Sanitary Engineering. His career in private practice, government, and applied research has given him the opportunity to experience and appreciate the varied interests and challenges of the profession.

Cecil has made many notable contributions to wastewater technology including two patents, by his scores of publications in the professional journals, eight books on a wide range of subjects in environmental engineering/science, and has given freely of his time to the cause of professional development through volunteer service to AAEE- Board of Trustees, Chair Eminence and Planning Committees; ASCE- Past President EWRI, Past Chair Environmental Engineering EXCOM; WEF- Past Chair Board of Editorial Review; IWA- Past Secretary Treasurer of USANC; AMSA-Past President, Past Chair Biosolids Management Committee; and USEPA- former member SAB Environmental Engineering Committee. His awards include AAEE-Kappe Lecturer 2003, G.Maskew Fair Award 2001; ASCE-Natl. Govt. Civil Engineer of the Year 1996, Simon Freese Award and Lecturer 1992; WEF-Chas. Emerson Medal 1996, and AMSA- Environmental Award 1999 and 1998, President's Award 1992.

Cecil is a Fellow and Life Member of ASCE, was certified a Diplomate by the Academy in 1982, and was elected a Member of the National Academy of Engineering in 2000.

As Vice President of AAEE, Cecil will be committed to strengthening the Academy's position as the nation's premier certifying body for Environmental Engineers while extending its influence to better embrace and keep pace with the changing culture, demographics, and engineering/science demands of the profession.

TRUSTEE-AT-LARGE

(existing seat — 3-year term)

GARY S. LOGSDON received his B.S.C.E. and M.S. San. E. from the University of Missouri (Columbia) and D.Sc. from Washington University (St. Louis).

He served as a Commissioned Officer with the U. S.

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Public Health Service for 26 years. Much of his career focused on drinking water research with a strong emphasis on filtration. He retired in 1989 and began a second career with Black & Veatch, directing pilot plant filtration studies and evaluating water filtration plants. He was the Principal Investigator for the American Water Works Association Research Foundation's Project 2511, Filter Maintenance and Operations Guidance Manual. He retired from employment at Black & Veatch in 2004 and now works as a self-employed consultant.

American Water Works Association activities include member, Coagulation & Filtration Committee; Chair, Filter Materials Standards Committee; Chair, Small Systems Guidance Committee; Chair, Small Systems Policy Committee; and member; Technical & Professional Council. He is presently on the Source Water Protection Committee. Logsdon served on two National Research Council committees and one term on the Water Science & Technology Board.

Professional honors include member, Civil Engineering Academy of Distinguished Alumni, University of Missouri; and the A. P. Black Research Award from AWWA.

He is a Licensed Professional Engineer in Michigan and was certified as an Academy Diplomate in 1984.

Logsdon has served one term as an Academy Trustee, was a member and subsequently Chair of the Water Supply and Wastewater Subcommittee, and was the 2004 Kappe Lecturer, making 16 official Kappe visits at colleges and universities.

RADM BOB WILLIAMS has more than 25 years of experience in environmental engineering. He is the Chief Engineer of the United States Public Health Service, providing advice and consultation on public health engineering matters to the Surgeon General and to over 1200 engineers in the Public Health Service. He is also is the Chief of Staff, Office of the Surgeon General (OSG). Prior to his assignment to the OSG in 2004, he served as the Director, Division of Health Assessment and Consultation of the Agency for Toxic Substances and Disease Registry (ATSDR) since 1989. He received his B.S. in Civil Engineering and M. Eng. in Environmental Engineering from Texas A&M University and has continued his postgraduate education with courses in public health.

RADM Williams is a Registered Professional Engineer and serves, or has served, as an officer and member of national committees for several professional organizations including: American Water Works Association, Water Environment Federation, American Society of Civil Engineers (ASCE Fellow Grade), Society of American Military Engineers (SAME Fellow) and the Commissioned Officers Association of the US Public Health Service. He has been a Diplomate since 1992 and has served in various positions with AAEE, including the Board of Trustees and his current position on the Certification by Eminence Committee. RADM Williams served on the Governing Board of the ASCE Environmental and Water Resources Institute from its inception until 2004. He currently serves on the Board of Directors of the Society of American Military Engineers.

He is an Adjunct Associate Professor at the Texas A&M University School of Rural Public Health and a member of the Emory University Academic Advisory Council, responsible for developing the University's environmental health curriculum. He has authored and presented more than 100 publications on a wide variety of environmental health issues, including the co-editing of four books.

RADM Williams received the Stanley Kappe Award from AAEE in 2004. He has received the CFEE Federal Environmental Engineer of the Year, PHS Engineer of the Year, and NSPE Top Ten Federal Engineer. He received the Gorgas Medal from the Association of Military Surgeons of the United States and the ASCE Government Engineer of the Year in 2003. He is the recipient of the USPHS Meritorious Service Medal, two Outstanding Service Medals, three Commendation Medals, an Achievement Medal, Crisis Response Service Award, and ten Unit Commendation Medals. He has received several group awards including the DHHS Secretary's Distinguished Service Award, SAME Cumming Plaque, and ATSDR/CDC Honor Awards for Public Health Practice. He has also received several awards from professional organizations (e.g., ASCE Best Practice Paper) for his efforts in environmental engineering.

TRUSTEE-AT-LARGE (Three New Seats)

RAJ BHATTARAI received his B.S. in Civil Engineering from the Indian Institute of Technology, Kanpur in 1976, and his M.S. in Environmental Health Engineering from the University of Texas at Austin in 1980. That year he started working for the Texas Department of Water Resources.

Since 1984, Raj has worked for the City of Austin's Water Utility. He was the project manager for the expansion of Austin's largest wastewater treatment plant, and biological nutrient removal study, and worked on reclaimed water program, treatment plant re-rating, and numerous permits, studies, grants, and research projects.

Raj currently manages Austin Water Utility's Environmental and Regulatory Services Division. In addition to overseeing research projects, tracking environmental regulations and legislation, and ensuring regulatory compliance, he and his team are liaisons to regulatory agencies, environmental, professional and research organizations, and manage the activities of the Center for Environmental Research, a consortium of the City of Austin, UT, and the Texas A&M University. He also teaches short courses at UT.

Raj is an AAEE Audit Committee Member. He was a Program Committee Member of the Water Environment Federation, Program Committee Chair, Membership Chair, and Conference Chair of the Water Environment Association of Texas (WEAT), and the Treasurer, Representative, and President of WEAT Central Texas Section. He is a Project Subcommittee Member of the Water Environment Research Foundation, an active member of the Association of Metropolitan Sewerage Authorities (AMSA), and served as the President of the Texas AMSA. He has received WEF's Gascoigne Medal and Bedell Award.

JOHN D. BOOTH, P.E., DEE, is the Executive Director and CEO of the Solid Waste Authority of Palm Beach County, Florida, and was the cover feature on the April 2003 issue of the Academy's "Environmental Engineer." He has a B.S. Degree in Civil Engineering from Washington University in St. Louis and a Master's Degree in Engineering Management from the University of Missouri/Rolla. Mr. Booth also serves as an adjunct professor of Environmental Engineering at Florida Atlantic University in Boca Raton, Florida, teaching courses in Solid Waste Management and Air Pollution Control Technology. He is a nationally recognized expert in Integrated Solid Waste Management and is licensed in three states.

Mr. Booth has served as a member of the Academy's Solid Waste Committee for the past four (4) years and serves regularly as an examination panel member for prospective new diplomats. Mr. Booth serves on the Board of the Florida Center for Solid and Hazardous Waste which provides State-appropriated research funds for nationally recognized research work in solid and hazardous waste management. He also serves on the Advisory Board for the Department of Civil Engineering at Florida Atlantic University and has been appointed by Florida's Governor Bush to serve as the Palm Beach County Commissioner for the Florida Inland Navigation District, a special taxing district created in 1927 to improve and maintain the Intercoastal Waterway from Jacksonville to Miami.

Mr. Booth came to the Solid Waste Authority in 1987 as Director of Engineering and Environmental Programs to organize, staff, and manage the Solid Waste Authority's Planning, Engineering, Construction and Environmental Programs Departments with the responsibility for designing, permitting,

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and constructing approximately $500M of solid waste management infrastructure in Palm Beach County. The Authority's waste-to-energy, recycling, and composting facilities have received national and worldwide acknowledgement for setting the standards for technology and operating effectiveness.

Mr. Booth's 40-year career also includes serving as the Chief Engineer and General Manager for Development of the Bi-State Development Agency in St. Louis with responsibility for the development of major regional air, water, mass transit, and solid waste management facilities and operations. Mr. Booth was commissioned as an officer in the Navy Civil Engineer Corps in 1967, is a Vietnam Veteran and was awarded the Navy Commendation Medal from Admiral John Hyland Commander-in-Chief U.S. Pacific Fleet for work in the Philippines. Mr. Booth and his wife Ann have four children and two grandchildren, and reside in Palm Beach County, Florida.

JAMES T. CANADAY has more than 30 years experience in environmental engineering. He received an M.S. in Engineering from West Virginia University in 1971 and returned to service with the Virginia State Water Control Board where he had been on leave of absence while in graduate school. Responsibilities with the Water Control Board included industrial waste treatment process issues and review of engineering design submittals for municipal advanced wastewater treatment facilities.

In 1974, Mr. Canaday became the Deputy Engineer-Director of the Alexandria, Virginia Sanitation Authority with prime responsibility for technical oversight of the operation and maintenance of the Authority's treatment facility; a 54MGD advanced wastewater treatment plant. In 1993 Mr. Canaday was appointed by the Authority Board of Directors to the position of Engineer-Director. In this capacity he is the chief executive and is responsible to the Board for the administration of all the programs, policies and activities of the Authority.

Mr. Canaday has been a Diplomate since 1994 and is currently a member of the Bylaws, Policies and Procedures Committee and is the State Representative for Virginia. He is also active in the Water Environment Federation and is currently Co-Chairman of the Infrastructure Task Force and is WEF's representative to both the Water ISAC Board of Managers and the Water Sector Coordinating Council. In addition, Mr. Canaday is a member of ASCE, NSPE and APWA. He also served on the Board of Directors of the Association of Metropolitan Sewerage Agencies from 1995-2004 and was appointed to two terms on the Science Technology Curriculum Advisory Committee of the Northern Virginia Community College system.

DR. DAVID A. DZOMBAK is a professor in the Department of Civil and Environmental Engineering at Carnegie Mellon University. The emphasis of his research and teaching is on water quality engineering and environmental remediation.

Dr. Dzombak received his Ph.D. in Civil-Environmental Engineering from the Massachusetts Institute of Technology in 1986. He also holds an M.S. in Civil-Environmental Engineering (1981) and B.S. in Civil Engineering from Carnegie Mellon University (1980). In addition, he received a B.A. in Mathematics from Saint Vincent College in Latrobe, PA (1980 / 3-2 liberal arts-engineering program). He is a registered Professional Engineer in Pennsylvania.

Dr. Dzombak's professional service activity has included the EPA Science Advisory Board (Environmental Engineering Committee, 2001-present); the EPA National Advisory Council for Environmental Policy and Technology (2004-present); the National Research Council (Committee on Bioavailability of Contaminants in Soils and Sediments, 2000-2002); Associate Editor of Environmental Science & Technology (2005-present); Editorial Board of Water Environment Research (1993-1998); Board of Directors and Officer (Treasurer) of the Association of Environmental Engineering and Science Professors (1996-1999); and chair of committees for the American Academy of Environmental Engineers, American Society of Civil Engineers, and Water Environment Federation.

Dr. Dzombak was elected as Fellow of the American Society of Civil Engineers in 2002. Other recent awards include the Professional Research Award from the Pennsylvania Water Environment Association (2002); and the Jack Edward McKee Medal from the Water Environment Federation (2000); and an Aldo Leopold Leadership Program Fellowship from the Ecological Society of America (2000).

LEROY C. FEUSNER is an environmental/chemical engineer with 37 years of experience. He received his B.S. in Chemical Engineering from the University of Wyoming in 1968. After graduation, he was commissioned into the Air Force as a Bioenvironmental Engineer. He earned several military decorations, including USAFR Outstanding Bioenvironmental Engineer during his Operation Desert Storm deployment in 1991.

Since 1978, he has worked for the Wyoming Department of Environmental Quality, Water Quality Division as a district office engineering supervisor (1978 to 1986); environmental quality emergency response supervisor (1986 to 1990); and, since 1990, as the Storage Tank Program Engineering Supervisor.

Mr. Feusner is a licensed professional engineer in South Dakota and Wyoming. He worked with NCEES in the early 1990s to define environmental engineering and establish the professional knowledges for the national environmental engineering licensing examination.

Since becoming a Diplomate in 1984, he has served as Chair of the Hazardous Waste Sub-Committee, the Examination Committee, and Wyoming Membership, as well as the Academy representative on the NCEES Participating Organizations Liaison Council. Mr. Feusner is currently Chair or the Re-Certification Committee and considers it a personal and professional honor to have received the first Academy certification in hazardous waste management in 1987.

His many years of professional environmental engineering work experience and continuing involvement in Academy activities are strong indicators of his dedication and support for the Academy's mission and future.

He and his wife, Lynnette, a successful Creative Memories Director, have been married for 37 years with two grown daughters. Mr. Feusner is also active in several community youth activities sponsored locally by the Cheyenne Kiwanis Club.

SANDY TRIPP has more than 22 years of experience in municipal water and wastewater engineering. She earned her bachelor's and master's degrees from Michigan State University and, upon graduation in 1982, began her career in consulting engineering. She started with Boyle Engineering Corporation and then joined CDM in 1996. Currently an Associate with CDM, Sandy has managed a myriad of projects from planning through construction. A registered engineer in several states, Sandy has published many professional papers on both the state and national level. She is a program manager and is active in the training and development of project managers.

In addition to her duties as a consulting engineer, Sandy has contributed substantially to several professional societies. She became a Diplomate of the American Academy of Environmental Engineers in 1993 and has been serving as the North Carolina State Representative since 1997. Sandy is currently leading the development of a local chapter of AAEE in North Carolina. Sandy has been a member of the Admissions Committee since 1993 and has served as Deputy Chair of this committee since 2002. Sandy was also Chair of the Membership Committee from 2001 to 2003 and has worked on various ad hoc committees with the Academy over the years.

Active in AWWA and WEF, Sandy was presented with an Outstanding Service Award from the North Carolina chapters in 2003. Her activities have included serving as Chair of the Seminars and Workshops Committee, Board Secretary, and Chair of the Water Reuse Committee for NC AWWA/WEA.

Part 2: Delivery

by Brian P. Flynn, P.E., DEE

PROJECT PROFITS: *DESIGN AND DELIVERY*

Project Managers assume that a project budget includes a profit, but are often at a loss to know how much. The basics of proper project pricing were explained in Part 1[1] of this article. Now we show how to calculate, and then deliver the expected profit from the engagement.

HOW IS PROJECT PROFITABILITY CALCULATED?

Project profitability is calculated using the following equation:

$$P_p = R_p - C_s - C_d - C_{MER} - Ds\ (M_B)$$ [Equation 1]

Where,

P_p = Project profit ($)
R_p = Total project revenue ($)
C_s = Cost of subcontractors ($)
C_d = Cost of direct project expenses (i.e travel) ($)
C_{MER} = Cost of miscellaneous expenses recovered ($)
Ds = Direct salary costs attributable to project ($)
M_B = Firm's breakeven multiplier

The firm's breakeven multiplier is calculated from the firm's overall Profit and Loss Statement by using the familiar SUM concept [2], and setting the profit equal to zero resulting in:

$$M_B = 1 / (US)$$ [Equation 2]

Where,

U = Firm's Utilization
S = Firm's Salary to Expense Ratio

Recognizing that the project's net revenue, N_R is equal to $R_p - C_s - C_d - C_{MER}$, we can combine Equations 1 and 2 and simplify to

$$P_p = N_R - Ds^* (1/US)$$

Thus, for a firm with a breakeven multiplier of 2.5, for every dollar of direct salary attributed to the execution of a project, $1.50 must be added for the project to pick up its' fair share of the sum of 1) the cost of the firm's unbillable overhead expenses and 2) the cost of unbillable time within the firm. This implies that a project's overall profitability does partly depend on the operating efficiency of the overall firm, i.e the firm's U and S.

Direct salaries for a project are calculated by multiplying the number of hours budgeted (or worked, if after the end of the project) times the hourly salary rate for each individual, then adding them up for the entire project team.

Let's calculate the expected profit from a lump sum engagement. We use a handy device: a profit matrix, as shown in Table 1. This is a simple way to depict Equation 1 in spreadsheet form. In this case the project has a budget (expected revenue) of $100,000.

Note that the sum of the differences between budget amounts and assumed costs for the 1) lab, 2) direct project costs and 3) MER charges represents the firm's handling fee (actual or effective).

The expected project profit is $26,700. The expected net revenue is total revenue minus the costs of subs, project direct expenses, and the costs of MERs. Thus, expected net revenue is $100,000 – 17,500 – 1,800 – 4,000 or $76,700. The expected return on net revenue is $26,700/$76,700 or 34.8%. A very nice project.

TABLE 2.
SCOPE CONTROL TOOLS

Clearly written proposal with clear endpoint to the project
If needed — have the proposal define what is not in the scope
Distribute proposal to project team
Review scope at internal kickoff meetings — explain possible changes in direction
Ditto — client kickoff meeting
Review opportunites for additional work — internally and with client
Review individual team responsibilities
Watch scope carefully during execution
Set and enforce proper level of detail with team members
Encourage and expect team members to inform you of apparent scope problems
Get changes of scope where appropriate[3]

Direct salaries are calculated by multiplying the number of hours budgeted times the hourly salary rate for each individual, then adding them up for the entire project team.

Scope Control

Look at the list of principles in Table 2. Good scope control starts with a well thought out scope of work, embedded in a clearly written proposal. If you don't start with this, you have already lost control of the scope. Once into a project, the major scope problems tend to center on scope creep, changes of scope, and level of detail. Examples follow.

Scope creep can be initiated by the client or the project team! "Sure we said that we would do a conceptual design of a wastewater impoundment, but let's throw in an unrelated drum storage area next to the new impoundment."

TABLE 1.
PROFIT MATRIX LUMP SUM BUDGET

Item	Budget Revenue	Cost	Expected Profit
Personnel Charges	$70,000 ($20,000 direct salaries)	$50,000 ($M_B$=2.5)	$20,000
Lab	$20,000	$17,500	$2,500
Direct Project Expenses	$2,000	$1,800	$200
MER Charges	$8,000	$4,000	$4,000
TOTAL	$100,000	$73,300	$26,700

EXECUTION

Now the rubber hits the road. The project has to be executed. The keys are control of the "Big Three": scope, schedule, and budget. The following is a broad survey of each. A whole book could easily be written on these subjects. The key is to manage, not react. To be ahead of your project team, not trying to catch up. And to execute these simple principles without exception.

The client requests that an extra, but "small" site be audited across the road from a site included in the proposal. This is a change of scope, not a use for project contingency.

TABLE 3.
SCHEDULE CONTROL TOOLS

Develop schedule using the factor of 3 rule
Schedule team members time early
Notify team members promply of client acceptance of engagement and give them the schedule
Explain schedule at internal kick-off meeting, including key internal check-points
Internal kick-off meeting; define first steps to get started
Explain schedule at client kick-off meeting, including key client check-points
Define information sources early
Tour client site and obtain health and safety requirements
Line up subscontractor schedule(s)
Define critical path and resources needed
Aim to finish early (establish schedule contingency)
Be proactive, and act early in response to problems
Enforce project milestones and intermediate checkpoints
Follow-up on schedule commitments
Promptly solve schedule problems, adjust schedule as needed
Always keep pressure on to stay on schedule
Encourage and expect project team members to inform you of apparent schedule problems

If I have a detail design engineer doing a conceptual cost estimate, I have to remind the engineer of what to include and not include in the estimate, to maintain control of the level of detail. For example, I may need just an allowance for piping, not a detailed layout with an equipment takeoff list.

If you look at Table 2 again, it becomes obvious that the underlying concept is clear communication of the scope, to the client, to the project team, and from the project team to the project manager.

Schedule Control

Table 3 lists some useful practices for schedule control. Some need a little explanation.

If a client has no immediate, firm deadline for the completion of an engagement, it is useful to determine how long the project would last if executed as quickly as possible. If this is, say, four weeks, then construct a schedule that is three times longer: twelve weeks. This gives you the flexibility to assign personnel to the project in an orderly fashion taking into account your firm's other work commitments. This cannot be done, obviously, if the client has a firm and tight deadline to meet.

It is fundamental throughout the schedule control process to show and expect a clear commitment to staying on schedule.

Internal kickoff meetings with key project personnel are always very useful for setting scope, schedule, and budget requirements. It is very helpful at the end of the meeting to review with each individual the first one or two things that they need to do to get started on the project. This avoids the possibility of starting the project off on the "wrong foot".

It is fundamental throughout the schedule control process to show and expect a clear commitment to staying on schedule. Rather than run the project on autopilot, it is incumbent on the project manager to keep asking project team members to report on progress, and insist that they report schedule problems on their own. In today's world we have plenty of tools (email, telephone, fax, blackberries, passenger pigeon's etc.) to do this, even when working with project team members across many time zones.

In the end, good schedule control is the foundation of good budget control. It is harder (though not impossible!) to overrun a budget when you stay on schedule.

Budget Control

Table 4 lists some useful practices for controlling budget. Again, these tools rely on good two way communication between the project manager and the project team.

Timesheet management is a practice whereby a project manager insists that a project team member record a certain number of hours on a project task regardless of how much time was actually used. It is a method for forced budget control. It should not be done. It destroys useful and needed

TABLE 4.
BUDGET CONTROL TOOLS

Give detailed budget to team members
Review budget versus tasks and individuals
Provide correct work order number!
Do not engage in timesheet management — this eliminates proper budget feedback
Do not give away the contingency
Everyone knows and is held responsible for their part of the budget
Provide proper coaching
Define level of detail for output
Check progress and adhere to budget
Overdefine the report
Use percent complete, burn rate, or real-time data to monitor costs vs budget
If over budget, but close, reconsier task completion estimates; plan further efficiencies
Make sure that no change orders are missed
Early notification of client of budget problems, if T & M

budget feedback, and inculcates a partial "work for free mentality".

A project manager should clearly show the team members the details of the project budget, but should caution them to use contingency hours only after a discussion.

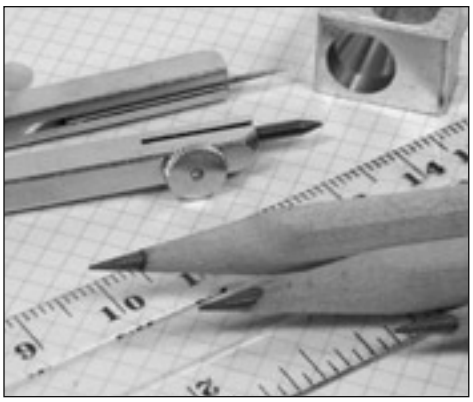
The project output, often a report, should be very well defined for the project team members, as this task can take up to 20-25% of a project budget. An annotated outline, with a page budget, is one very useful technique.

Checking project progress versus actual costs incurred is very important. When using the percent complete method, the project manager determines the product of the percent completion of each budget task and the budget for that task. These values are added up and compared to costs to date. The project manager then knows whether the project is tracking under or over budget and can take appropriate action. The "burn rate" method is really the same thing, except it is for a long duration project (maybe construction inspection) which has a constant rate of expenditure per month. In some cases, a project is very intense and of short duration. In this case, the project manager needs something approaching a real time cost gathering system: some accounting systems can be close to this (if timesheet data is entered promptly and consistently), or the project manager has to cobble one together by getting individuals to report hours and costs directly to the PM.

A project manager should clearly show the team members the details of the project budget, but should caution them to use contingency hours only after a discussion.

Actual Project Profitability

Assume that the project budgeted in Table 1 actually turns out as follows: lab costs are $19,000 not $17,500; direct project expenses are $2,000 not $1,800; MER charges are $3,500 not $4,000; and direct salaries used are $17,100 instead of the budgeted $20,000, then we reuse Equation 1 to determine the *actual* project profit:



$$P_p = \$100{,}000 - 19{,}000 - 2{,}000 - 3{,}500 -- (17{,}100 * 2.5)$$

The actual profit is $32,750. The actual net revenue is $100,000 – 19,000 – 2,000 – 3,500 or $75,500. The actual return on net revenue is $32,750/$75,500 or 43.4%. The lump sum project turned out to be even more profitable because it was done with less personnel dollars than budgeted.

ERRATA

Part 1 of this article, published in the Fall 2004 issue of this magazine stated "a budget estimate that is *below* the client's stated budget…should be an invitation to either decline the potential engagement or negotiate to cut the scope". This statement should have indicated *above*, not below.

REFERENCES

(1) "Project Profits: Design and Delivery", *Environmental Engineer*, Fall 2004. Brian P. Flynn, P.E., DEE.

(2) "Planning for Profits: The SUM Concept", *Environmental Engineer*, July 2000. Brian P. Flynn, P.E., DEE.

(3) "Changes of Scope & Accounts Receivable", *Environmental Engineer*, January 2002. Brian P. Flynn, P.E., DEE.

ABOUT THE AUTHOR

Brian P. Flynn, P.E., DEE is an environmental engineer and management consultant/trainer concentrating on improving the efficiency and profitability of environmental engineering firms. He practices his specialty world-wide from an office in the Denver area. He can be reached at bflynn4290@aol.com.

Excellence in Environmental Engineering®

2005

THE EXCELLENCE IN ENVIRONMENTAL ENGINEERING® competition of the American Academy of Environmental Engineers exists to identify and reward the best of today's environmental engineering. Its criteria define what it takes to be the best in environmental engineering practice: a holistic environmental perspective, innovation, proven performance and customer satisfaction, and contribution to an improved quality of life and economic efficiency.

The competition, begun in 1989, is organized around the normal phases of development and implementation of environmental management projects and programs: research, planning, design, and operations and management. This Year's entrants to the competition provide a clear indication of the trajectory of modern environmental practice. On the one hand, engineers continue to advance the exploitation of computers to enable more realistic modeling of naturally-occurring phenomena, more accurate and more timely mapping and monitoring, and more precise control of processes thereby providing increased effectiveness and efficiency. At the same time, there is also greater beneficial use of natural ecosystems, sometimes improving upon existing conditions and sometimes creating conditions that replicate nature. Increasingly, engineers are part of a team with total project responsibility from concept and design through construction and ultimately operations and management of these innovative environmental projects.

Those chosen for prizes in 2004 by an independent panel of distinguished experts, addressed the broad range of modern challenges inherent in providing life-nurturing services for humans and protection of the environment. They are but a small percentage of the many projects involving environmental engineers around the world. Nevertheless, their innovations and performance illustrate the essential role of environmental engineers in providing a healthy planet. These award winners testify to the genius of humankind and best exemplify the Excellence in Environmental Engineering® criteria.

A GRAND PRIZE
is awarded in each category.

SUPERIOR ACHIEVEMENT FOR EXCELLENCE IN ENVIRONMENTAL ENGINEERING
is awarded to the best entry.

AN HONOR AWARD
is awarded to others deserving of commendation.

ENTRANT: CH2M Hill
ENGINEER IN CHARGE: Jay Gaudlitz
PROJECT NAME: Johnston Atoll Closure
LOCATION: South Pacific

SUPERIOR ACHIEVEMENT AWARD

JOHNSTON ATOLL CLOSURE

LEFT
Johnston Island is the largest of the four small coral islands that form Johnston Atoll. Fifty-five years of weapons destruction and nuclear testing left a legacy of environmental contamination. CH2M HILL worked closely with the U.S. Air Force to help return the islands to their natural state as a wildlife refuge.

RIGHT
Today Johnston Atoll and the surrounding waters are home to three endangered species: green sea turtles, Hawaiian monk seals, and humpbacked whales. The islands also host a myriad of tropical reef fish and nesting seabirds, and 33 species of coral grow in the surrounding reef.

Johnson Atoll, a group of four remote Pacific Islands located 800 miles southwest of Hawaii, supports a rich and varied ecosystem. However, fifty-five years of base operations including storage and incineration of chemical weapons, and nuclear testing left significant environmental contamination on Johnston Atoll.

In 2002 The Air Force and CH2M HILL led a 20-month mission to return the atoll to its previous state as a wildlife refuge. Diverse stakeholders in the project included the Air Force and other Defense Department agencies, Environmental Protection Agency (EPA), and Fish and Wildlife Service (FWS) personnel; biologists, ecologists, geologists, and toxicologists; and environmental, electrical, mechanical, and civil engineers.

From December 2003 to June 2004, property transfer, toxic material abatement, demolition, and habitat restoration activities continued relentlessly. CH2M HILL cleaned up groundwater and soil containing multiple contaminants at 8 major sites and emptied, cleaned, and flattened the infrastructure of a 2,000-person town while simultaneously ensuring 200 onsite personnel had necessary food, water, fuel, sanitation systems, communications, medical facilities, and airlift/sealift capabilities.

Given the precedent-setting technical achievements, the project faced significant engineering challenges. Nonetheless, CH2M HILL completed the $84 million historic restoration two weeks ahead of schedule.

Today, these biologically diverse islands and the surrounding reef host a myriad of tropical fish, 12 species of seabirds and 33 species of coral. The reef community also supports three endangered species: green sea turtles, humpbacked whales and Hawaiian monk seals.

ENTRANT: Black & Veatch Corp.
ENGINEER IN CHARGE: Gerald B. Benson, P.E., DEE
PROJECT NAME: Evaluation of Ozone and Ultraviolet Light
LOCATION: Clinton, Massachusetts

GRAND PRIZE RESEARCH

EVALUATION OF OZONE & ULTRAVIOLET LIGHT

A special collaborative team, led by Black & Veatch and including water utilities and university researchers, has produced promising research findings that identify a new, safe and cost-effective disinfection strategy: the sequential application of ozone and ultraviolet (UV) light.

This research was the first project to examine the sequential treatment of raw water with ozone and UV with an emphasis on disinfection effectiveness and disinfection byproducts. This information will be vitally important to water professionals in reaching compliance with emerging Stage 2 Disinfectants/Disinfection By-Product regulations.

This is the first comprehensive ozone and UV light research program in the world for consumer water quality assessment. The Massachusetts Water Resources Authority (MWRA) built the largest ozone and ultraviolet light testing facility, while the Town of Concord built the first full-scale system to deliver ozone+UV-treated water to U.S. consumers. The pilot operation demonstrated process reliability and ease of operation as well as design elements that enhanced efficiency and effectiveness.

The research provided evidence that combining the strengths of ozone (oxidation, taste, odor reduction and virus inactivation) with UV (Cryptosporidium inactivation) and chlorine or chloramines (bacterial inactivation and protection within the distribution system) provided a highly cost-effective treatment benefit. From a regulatory perspective, ultraviolet light in concert with ozone presents a multiple disinfection barrier approach to protecting public health.

LEFT
Town of Concord, MA operator receives instruction of proper cleaning of UV lamps. Concord, MA UV system was added to existing ozone facility resulting in an ozone/UV facility among the first in the U.S. Water from the facility was delivered to Concord, MA customers.

RIGHT
Award winning 100-year old 6-inch diameter unlined cast iron pipe, on right, serves as a distribution system simulator. This allowed for a water quality assessment of tap water received by customers.

ENTRANT: Malcolm Pirnie, Inc.
ENGINEER IN CHARGE: Thomas J. Lane, P.E., DEE
PROJECT NAME: Integrated Planning for Station 6 Groundwater Management
LOCATION: South Jamaica, Queens, New York

GRAND PRIZE PLANNING

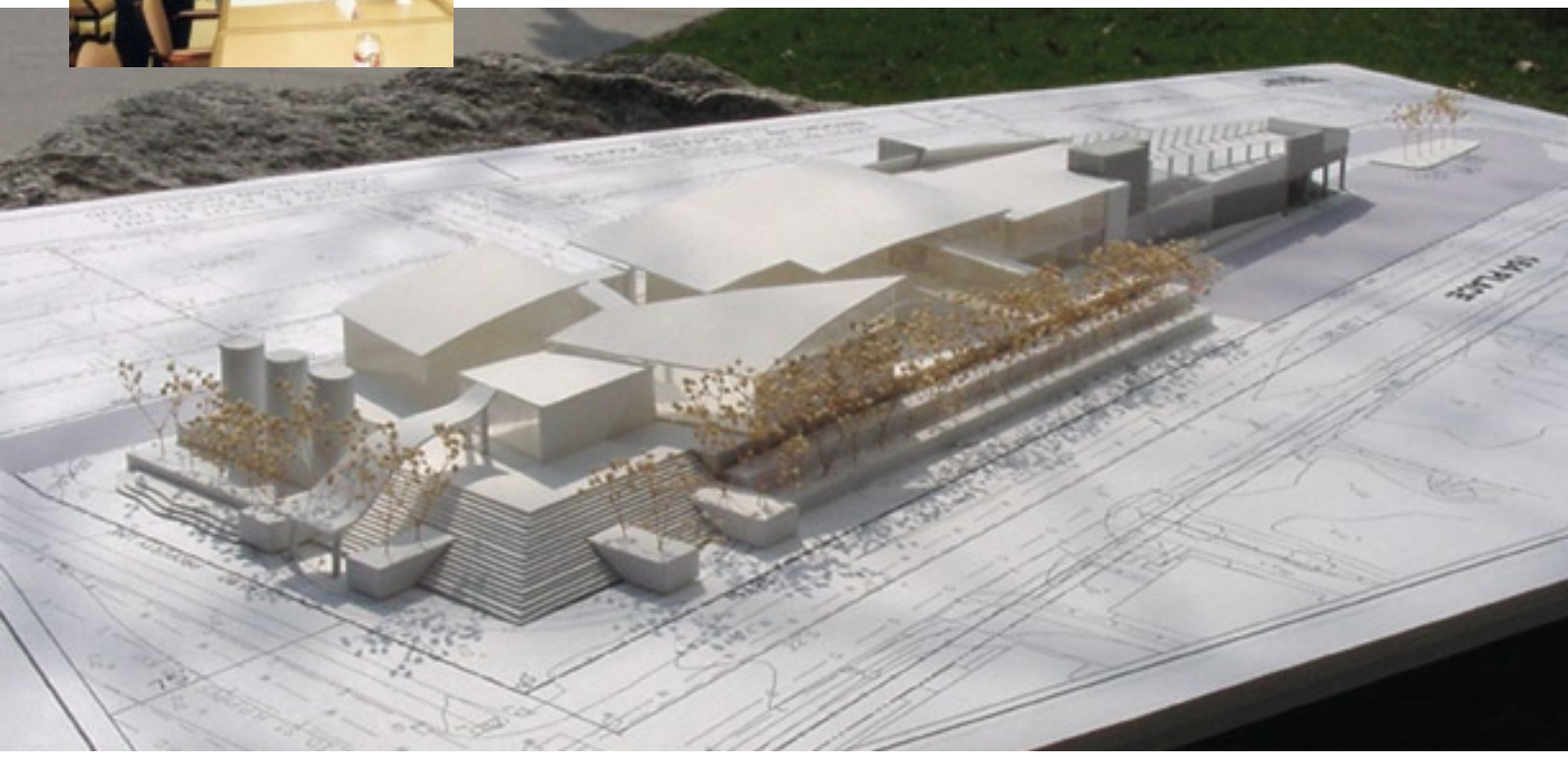
INTEGRATED PLANNING FOR GROUNDWATER MANAGEMENT

Malcolm Pirnie undertook a unique groundwater management pilot project to demonstrate that high-quality drinking water can be produced from groundwater beneath the heavily urbanized boroughs of Brooklyn and Queens. Conducted for the New York City DEP, the project had multiple goals of providing a consistent supply of high quality drinking water while controlling neighborhood groundwater flooding and coordinating with remediation of local hazardous waste sites.

Raw groundwater quality presented complex challenges: high levels of naturally occurring iron and manganese, natural hardness and volatile organic contaminants that had entered the aquifers through spills.

By using an unprecedented combination of unit processes - including ozonation, ultrafiltration, air stripping and reverse osmosis – Malcolm Pirnie was able to address the multiple water quality challenges. Contaminants were removed and disposed in a safe, environmentally sound manner to the City's sanitary sewer system.

As a result of the pilot project, a new 10 million gallon per day groundwater treatment plant, Station 6, will ultimately produce water in the area with as high quality as the City's upstate water sources.



ENTRANT: CH2M Hill and Boyle Engineering
ENGINEER IN CHARGE: Lawrence J. Schimmoler, P.E./Thomas J. Roode, P.E.
PROJECT NAME: Denver Water Recycling Plant
LOCATION: Commerce City, Colorado

GRAND PRIZE DESIGN

DENVER WATER RECYCLING PLANT

After 35 years of research and pilot studies, Denver Water commissioned Boyle Engineering and CH2M HILL to design its full-scale non-potable recycling plant and associated distribution facilities in 1997.

The project's first phase of a 30-million-gallon-per-day treatment plant, distribution, storage, pumping, and piping to initial customers was completed in February 2004. The treatment plant will be expanded to 45 mgd and the distribution system will be extended in subsequent phases to ultimately deliver approximately 17,700 acre-feet of recycled water.

The Denver Water Recycling Plant is the only plant of its kind in the world Using biological aerated filter (BAFs) technology for recycled water, capturing interest from technologists as far away as Paris. Industrial water quality requirements (zero ammonia and low phosphorus) demanded complex solutions–BAFs, in conjunction with break-point chlorination and ferric phosphate co-agulation and settling, provide that solution. BAF technology uses polystyrene granules coated with bacteria to oxidize ammonia.

The system captures effluent water from the Metro Wastewater Plant before it is discharged to the South Platte River, which significantly reduces the river's nutrient load and preserves its ecosystems. Wetlands impacted during construction were restored, and wildlife has returned. Plus, by recycling water, the need to develop new water resources is deferred, or in some cases, eliminated.

BELOW
The plant's Distribution Pump Station is located on top of the on-site storage reservoir to reduce costs. The pumps deliver recycled water to customers including Xcel Energy's Cherokee Power Plant, the Denver Zoo, and various schools and parks. The recycled water is delivered in "purple pipes," the industry standard designating non-potable water. This is a separate system from the drinking water system. The design, construction, and operation prevents any chance of cross contamination between the two systems.

ENTRANT: CDM
ENGINEER IN CHARGE: J. Ellis Turner, P.E., DEE
PROJECT NAME: Environmental Health Project II
LOCATION: Worldwide

GRAND PRIZE OPERATIONS/MANAGEMENT

WORLDWIDE ENVIRONMENTAL HEALTH PROJECT II

As program manager for the 5-year United States Agency for International Development (USAID) Environmental Health Project II (EHP II), CDM provided leadership in alleviating environmental health-related challenges facing developing countries, reducing childhood illness and mortality, and preventing the spread of infectious diseases.

CDM led an eight-member consortium developing interventions; designing sustainable community-based activities; and implementing knowledge management in vector control, hygiene improvement, and water supply and sanitation infrastructure.

While EHP II initiatives spanned 34 countries, selected activities with worldwide impact and four representative landmark projects were highlighted in this award winning project–emergency response in the volatile West Bank; hurricane disaster relief in Nicaragua; population-health-environment initiatives in Madagascar; and a groundbreaking approach to urban health in India.

In Nicaragua, critical disaster relief following Hurricane Mitch and sustainable hygiene improvement strategies have improved health & sanitation for more than 215,000 people.

In the West Bank, after war destroyed the infrastructure and threatened public health, water systems were repaired, emergency commodities procured and supplies restocked for hundreds of thousands of people without safe water.

After precedent-setting population-health-environment initiatives were implemented in Madagascar, household access to water and sanitation facilities increased and severe malnutrition in children under 5 has been cut by more than 60%.

Finally, a ground-breaking hygiene improvement framework improved life for 50,000 people living in India's city slums.

LEFT
In Madagascar, population, health, and environment activities benefited 120,000 people and increased the number of households with access to safe water and basic sanitation. (Photo credit: Eckhard Kleinau)

RIGHT
CDM formed the Emergency Water Operations Center to repair water systems, procure essential commodities, and restock supplies for hundreds of thousands of people without safe water in the West Bank.

ENTRANT: Kennedy/Jenks Consultants
ENGINEER IN CHARGE: Douglas B. Henderson, P.E., DEE
PROJECT NAME: Lake Bard Hypolimnion Oxygenation
LOCATION: Thousand Oaks, California

GRAND PRIZE SMALL PROJECTS

LAKE BARD HYPOLIMNION OXYGENATION

The Calleguas Municipal Water District (CMWD) treats water stored in Lake Bard at the Lake Bard Water Filtration Plant (LBWFP). Each spring, the lake stratifies and by early summer, the available dissolved oxygen (DO) in the lake hypolimnion is depleted. Without oxygen, reduced nutrients and metals released from the lake bottom degrade water quality, making it harder to treat.

CMWD hired Kennedy/Jenks Consultants to improve water treatability and upgrade plant operations by comparing the cost-effectiveness of two approaches: 1) increase ozone system capacity, or 2) improve source water quality.

By selecting the latter, CMWD reduced ozone system operating costs at a time when liquid oxygen (LOX) supplies in California are limited and electrical power to produce ozone is expensive. Because ozone generators convert only about 6 percent of LOX to ozone, the project significantly increases the value of LOX by using off-gas to oxygenate the hypolimnion.

The new system takes oxygen-rich off-gas from the ozone contactor and oxygenates the lake hypolimnion. Kennedy/Jenks designed the pipeline and feed points to efficiently convey and disperse oxygen throughout the lake. Initial operations began this summer and demonstrate that the system works well, with highly promising preliminary results.

This is a "green solution" that cost-effectively takes a "waste product" and uses it to benefit operations and the environment. CMWD provides better water at minimal increased cost. The project saved $500,000 in capital costs compared with the alternative. Additional saving are expected and will be realized over time as operation and maintenance costs will be significantly lower than increased ozone generation and use.

LEFT
LOX tanks – The plant generates ozone using liquid oxygen (LOX), which the district buys and stores onsite in large tanks. The supply of LOX in California is limited and expensive.

RIGHT
Tower Eduction System – Oxygen is piped to the Eductor Panel on the Outlet Tower bridge.

ENTRANT: CH2M Hill
ENGINEER IN CHARGE: Scott L. Trusler, P.E.
PROJECT NAME: Cedar Water Treatment Facility
LOCATION: Renton, Washington

HONOR AWARD DESIGN

CEDAR WATER TREATMENT FACILITY

CH2M HILL designed and built the Cedar Water Treatment Facility to help the Seattle Public Utilities (SPU) meet strict regulatory criteria and maintain it's standing as one of only six water districts in the country not required to filter its water.

The resulting design integrates state-of-the-art ultraviolet and ozone injection technologies into the site with minimal impact on surrounding wetland and forested areas. The new technologies mean SPU can avoid building a costly filtration plant, saving approximately $200 million.

The highly automated plant operates 24/7 with just six staff and as Seattle's needs grow, the facility can be expanded to treat 75 mgd.

ENTRANT: CH2M Hill
ENGINEER IN CHARGE: Jane Rozga, P.E.
PROJECT NAME: Geysers Recharge Project
LOCATION: Santa Rosa, California

HONOR AWARD DESIGN

GEYSERS RECHARGE PROJECT

The City of Santa Rosa, California sought an environmentally responsible way to dispose of recycled water without increasing discharge to the Russian River. Calpine Geothermal needed water to recharge the aquifer at the Geysers, the world's largest steam field. The solution was a 40-mile pipeline conveying 11 million gallons of recycled water per day across the Santa Rosa plain and Alexander Valley and up 3,300 feet into the Mayacmas Mountains. From the terminal tank, Calpine distributes the water and injects it into 4,000-11,000-foot-deep wells to recharge the steam field.

The project has been on line for more than a year, successfully delivering water and generating power. A benefit for Pine Flat, CA residents was the addition of fire hydrants that helped extinguish the September 2004 Geysers Fire.

BELOW
Five miles of pipeline pass through the Audubon Wildlife Sanctuary. The design adjusted the alignment to avoid rare plant colonies. Since this species only blooms a few weeks in the season, identifying and marking the location was important in plotting the alignment. The contractor also sequenced construction in the sanctuary to avoid impacts on rare birds during their nesting season. *(Photo by city of Santa Clara)*

LEFT
After ozone contact, the water flows to the ultraviolet light facility for disinfecting more resistant organisms without the use of chemicals. The Cedar Water Treatment Facility is the first American plant to use UV technology on a large scale. CH2M HILL worked with the ultraviolet light vendor to design this unique vertical configuration for the 13 UV reactors. This vertical design reduced the building footprint to 45 by 74 feet, meaning less impact on the wetland and forested environment.

ENTRANT: The Joint Venture Team of Parsons and MWH
ENGINEER IN CHARGE: Greg McBain, P.E., DEE
PROJECT NAME: Olivenhain Dam and Reservoir
LOCATION: Escondido, California

HONOR AWARD DESIGN

OLIVENHAIN DAM & RESERVOIR

Designed by the joint venture team of Parsons and MWH, the Olivenhain Dam and Reservoir project was constructed to provide emergency water to the San Diego County region and survive a large regional seismic event.

This project includes a 318-foot tall, roller-compacted concrete (RCC) dam, the tallest dam of its kind in the nation and the first RCC dam in California, as well as a 24,000-acre-foot reservoir.

The Olivenhain Dam and Reservoir project utilized a planning process that set new standards for design and development of new storage facilities in an urban area while minimizing adverse environmental impacts and maximizing public participation and awareness.

RIGHT
The Olivenhain Dam has been designed to remain functional following a catastrophic regional earthquake, in part due to it robust structural and mechanical systems associated with the inlet and outlet of water from the reservoir. A multi-port tower is integrally constructed with the dam to allow the two structures to react as a single unit under seismic conditions. The six ports – two on each of three sides – are designed with robust mechanical systems with redundant operational modes to assure post-earthquake availability.

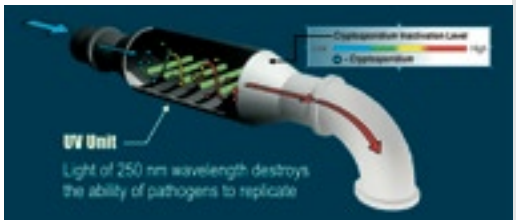
ENTRANT: Hazen and Sawyer, P.C./CDM
ENGINEER IN CHARGE: Richard Peters, P.E.
PROJECT NAME: Catskill/Delaware UV Disinfection Facility EIS
LOCATION: Mount Pleasant, New York

HONOR AWARD PLANNING

CATSKILL/DELAWARE UV DISINFECTION FACILITY EIS

The Hazen & Sawyer/CDM Joint Venture, under contract to the New York City Department of Environmental Protection, recently completed a comprehensive environmental impact statement (EIS) – a major milestone in building the world's largest ultraviolet light (UV) drinking water disinfection facility. The facility, to be located in Mount Pleasant, NY, will treat about two billion gallons per day of water from the upstate Catskill and Delaware systems which supply about 90% of New York City's drinking water.

The Catskill/Delaware UV Disinfection Facility will ultimately save the city over $1.5 billion in construction costs and about $25 million per year in operating costs compared to a more traditional filtration plant.



TOP (Rendering)
The footprint of the Catskill/Delaware UV Facility has been minimized through the placement of most process equipment below ground. The result is a low-profile, one-story main UV building that will be aesthetically pleasing, blending in well with the surrounding natural features.

BOTTOM (UV Diagram)
This EIS sets the stage for what will be the world's largest UV disinfection facility. During the disinfection process, UV light emitted from lamps inactivates pathogens in the water, such as Giardia and Cryptosporidium, by preventing them from reproducing, thus rendering them harmless. Using the largest available UV units (40 to 50 million gallons per day) has reduced the number of units required, thus minimizing the overall footprint of the UV facility and associated site disturbance, and avoiding wetlands encroachment.

ENTRANT: CDM
ENGINEER IN CHARGE: Michael Malloy, P.E., DEE
PROJECT NAME: Asbestos Emergency Response Project
LOCATION: Libby, Montana

HONOR AWARD OPERATIONS/MANAGEMENT

ASBESTOS EMERGENCY RESPONSE PROJECT

In 1999, in Libby, Montana, elevated death and illness rates prompted the US EPA to launch an emergency investigation of the 180-square-mile area around the town. The culprit was Libby amphibole asbestos, a trace contaminant of vermiculite that was mined and processed in Libby for 70 years. CDM responded to EPA's call within 48 hours, and over the course of 4 years has investigated, managed, designed and overseen construction of an accelerated Superfund cleanup – a unique $80 million undertaking.

In addition, since no regulatory guidance for Libby amphibole asbestos existed, CDM helped develop a new EPA protocol that will guide any future cleanup efforts for that type of asbestos.

TOP
An example of an annotated tablet image.

BOTTOM
Innovative and cost-saving approaches, such as encapsulating asbestos-contaminated solids located in crawlspaces instead of excavating them, resulted in an 80-percent saving for each crawl space.

ENTRANT: Malcolm Pirnie, Inc.
ENGINEER IN CHARGE: Peter Witko, P.E.,
PROJECT NAME: Glastonbury Site Remediation, Field Holstein Site
LOCATION: Glastonbury, Connecticut

HONOR AWARD SMALL PROJECTS

GLASTONBURY SITE REMEDIATION

In 2002, the town of Glastonbury, CT hired Malcolm Pirnie to develop and implement an innovative plan for cleanup of an inactive "Brownfield" site with 15 above ground petroleum storage tanks and soils and groundwater contaminated from years of use as a petroleum transfer facility.

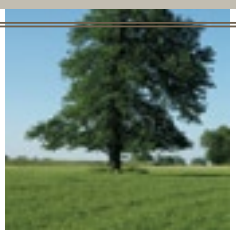
To meet the town's goal of creating a public access and recreational area out of the site, Pirnie devised an approach that included removing only contaminated soils that exceeded Polutant Mobility Criteria, plus on-site relocation of less highly contaminated materials, following an innovative grading plan that included covering these soils by 4 feet of clean soil to prevent possible human exposure.

BELOW
Work is already underway on construction of the new Community Center, the rist element of the planned public Riverfront Park. The construction schedule for this building drove much of the accelerated timeframe for the project's cleanup elements.

SINCE 1955, THE AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS has been pointing the way to ever better environmental engineering for the public's benefit. For more information about any of the these winning projects, contact the Academy Headquarters at:

AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS
130 Holiday Court, Suite 100
Annapolis, Maryland 21401
(410) 266-3311

Part II



A History OF THE AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS

1985 to 2005

by David W. Hendricks, PhD, P.E., DEE

The move to a full-time paid executive director was a major node point in the history of the Academy. The previous executive directors had served with essentially no pay (or token amounts), which was not sustainable for the mature organization that had emerged after three decades.

When Bill Anderson became executive director on January 22, 1985, the Academy had made the transition from a developing organization to one that was "mature", in the sense that its membership of 2301 was probably at the critical mass needed to sustain its basic mission, i.e., certification, as well as its ancillary supporting program.

Such program included: co-sponsorship (with AEESP) of the five-year environmental engineering education conferences; a newsletter, A^2E^2, that had evolved into a magazine *The Diplomate*, with "white-paper" articles by members; annual meetings of the Board; a set of awards with annual awards dinner; classes of membership; a membership chair for each state; additional sponsors; serving as the lead organization for ABET accreditation of environmental engineering academic programs; breakfast seminars and luncheons; and an array of committees. The program, as it evolved from the 1955 inception of the Academy, had been ratified by successive Boards.

What was needed at this point was to strengthen the existing programs. The Academy was not yet "institutionalized", i.e., as an entity that could sustain itself financially without an "active" concern about whether its membership numbers were beyond some "critical mass". Such critical mass was defined subjectively by the Board with respect to the kinds and levels of programs desired and felt necessary to underpin the basic mission of certification. A full-time, paid, executive director was a key step to add an increment of energy into the programs.

MISSION — THE 1985 SURVEY

The prime mission of the Academy, i.e., certification, was reaffirmed by the membership in a 1985 survey. To finance certification and the array of supporting activities, members preferred the use of dues rather than sources that could result in loss of independence. An expanded membership was the preferred means to provide for any

A full-time, paid, executive director was a key step to add an increment of energy into the programs.

increased budget needs. But activities that could be self-supporting, e.g., dinners, seminars, books, should be so. At the same time, the members emphasized that certification standards should be maintained, i.e., not traded for increased membership. A third continuing theme was that in order for certification to have value, it must be recognized by clients and those in the profession.

The findings of the membership survey gave support to the officers and Board for what they had been doing since the inception of the Academy and for the path that succeeding Boards would continue, executed and embellished by the new executive director. Also, the Academy officers had stated from the beginning that the onus was on the Diplomates to both use the DEE suffix and to engage colleagues to apply for certification. This was another theme that would be repeated over the next two decades by the presidents and by the executive director.

OFFICE OF THE EXECUTIVE DIRECTOR

Immediately, as Bill Anderson took office he embarked on reinforcing the existing programs and adding measures that further underpinned them. He affirmed that certification was the core purpose of the Academy and that the derivative activities were justified to support certification. Derivative activities included: adding content and features to *The Diplomate*, with name change in 1992 to *Environmental Engineer*. Two annual publications were added, i.e., *Who's Who in Environmental Engineering*, and the *Environmental Engineering Selection Guide*; these were distributed to potential clients of consulting engineers and others in numbers of up to 10,000 each per year.

In 1989, the Excellence in Environmental Engineering Awards® were started; this annual recognition of outstanding projects has become expected and the awards valued and recognized. The Kappe Lecture program was started in 1989, and was embraced immediately by the university community and, at the same time, gave additional visibility to the Academy. The Academy was designated in 1983 by ABET as the lead organization for accreditation of environmental engineering programs. Its sponsorship of the seven-year education conferences, started in 1960 at Harvard and chaired by Thomas Camp, was continued; by the second, in 1967 at Northwestern, AEESP had become co-sponsor. The Academy also encouraged organizations that had need of consulting engineer services to engage firms in which Diplomates could be a part of any contemplated project. Such policy by a client would help to ensure quality services.

BILL ANDERSON EXECUTIVE DIRECTOR

William C. Anderson was the ASCE representative to the Board of Trustees from 1982 through 1984. He had graduated with BSCE from Iowa State University in 1967 and was certified in 1977 by AAEE. Prior to becoming Executive Director, he was a partner in the consulting engineering firm of Pickard and Anderson, founded in 1973, with offices in Auburn, New York and Williamsport, Pennsylvania. His consulting career followed experiences with the Iowa Department of Health, the New York Department of Health, and Cayuga County New York (the latter as Director of Environmental Health).

In taking the position of executive director, Bill's dedication was to the Academy albeit through agreement with the Board he continued his consulting practice, phasing out over some fifteen years. The arrangement was feasible by working through his staff at Pickard and Anderson. The arrangement permitted Bill to maintain a "hands-on" touch with practice, which aided his understanding of the changing issues in the field and the profession.

In December, 2003, Bill resigned his position with the Academy to assume the position of Executive Director, Council of Engineering and Scientific Specialty Boards (CESB) in Annapolis. CESB was formed in 1990 to provide accreditation of engineering and technology certification programs. CESB also operates to advance the interests of certification programs in engineering and technology and is currently leading a multi-organization effort intended to devise a way to integrate certification with engineering licensure.

Environmental Engineer

Bill Anderson also acted as editor-in-chief of the quarterly, Environmental Engineer. Each issue had editorials by the president and executive director. Bill's editorials penetrated to the current issues of the profession and, at the same time, were intended to pique the interest of the reader and to stimulate thinking. Starting in 1986 Bill added "Profiles" and "Profiles in History" of engineers from academics, consulting, industry, and public organizations. [These were biographies of leaders in the field, past and current, who had been instrumental in advancing the profession.] Those featured in Profiles in History included Allen Hazen, Mark Hollis, Abel Wolman, Thomas Camp, Gordon Fair, among those deceased. Examples of persons featured who are still active include: Daniel Okun, Harvey Ludwig, Arthur Stern, Roy F. Weston, Earnest Gloyna, Ross McKinney (to name a few so that the reader may get a sense of those identified). The "Profiles" have included those who have gained contemporary prominence in one of the sub-specialties, e.g., air pollution, industrial hygiene, radiation protection, solid waste management, water supply and wastewater. About half of the profiles were researched and authored by Bill Anderson with others by persons who were familiar with the career of each subject. Table 1 lists those who have been featured through 2004, with an indication of affiliation. [Table 1 was compiled for the benefit of present readers and for archival purposes. Other kinds of listings are found in *Who's Who in Environmental Engineering* and are not repeated here; such listings include current committees, state representatives, past presidents, past executive directors, current staff, recipients of awards, honorary diplomats, recipients of the Excellence in Environmental Engineering Awards, accredited environmental engineering programs, and Kappe Lecturer's.]

In addition, position papers (representing the respective author's views, not the Academy's) were a part of each journal covering professional questions such as ethics, numbers of engineers (whether there is a surplus or shortage); engineering education (such as the role of the liberal arts, current requirements for entry to the profession), environmental issues (such as the 1987 Montreal Protocol, the 1992 Earth Summit in Rio, population stabilization, the global commons); health risks (such as dioxin in Times Beach, MO); reports on current issues such as, problems of developing countries, waste minimization, the role of computers; etc. A selection of titles for the period 1987-2003 is indicative of the kinds of issues covered, i.e.,

- Defining Ethics, by Aarne Vesilind, Vol. 22(4), 1987.
- The Liberally Skilled Professional James P. Weeks Vol. 24(4), 1988.
- Engineering the Environment – The Environmental Ethic, Dr. Robert M. White, Vol. 25(3) ,1989.
- Engineers Need A Liberal Education, Donna S. Queeney, Vol. 27(4), 1991.
- Dioxin Risk Assessment for Human Health, Vernon N. Houck, MD, Assist. Surgeon General, USPHS, Vol. 27(4), 1991. [The author asserted that a high dioxin load in human tissues does not cause cancer.]
- A Stroll Through Time in Environmental Engineering, Ross E. McKinney, Vol. 31(1), 1995.
- Protecting the Environmental Future: Looking Beyond the Horizon, Raymond C. Loehr, Vol.31(2), 1995.
- The Role of the Environmental Engineer/Scientist in Arbitration, Negotiation, and Courtroom Litigation, Davis L. Ford, Vol. 31(3), 1995.

TABLE 1.
PROFILES IN ENVIRONMENTAL ENGINEER

Year	Vol.	No.	P	PH	Name	Background
1985	20	4	x		James J. Corbalis, Jr.	Potomac River WTP
1986	21	1		x	Earnest Boyce	Engineer/Academic U. Mich.
	22				Joseph F. Lagnese/ James Coulter	
		2		x	Mark D. Hollis	USPHS/WHO
		3		x	Gorden Maskew Fair	Harvard Professor
1987	22	4	x		Daniel A. Okun	U. North Carolina
	23	2		x	Edward J. Cleary	ORSANCO
		3	x		John L. Cleasby	Mr. Filtration — Iowa State U.
		4		x	Abel Wolman	Elder Statesman — Johns Hopkins U.
1988	24	1	x		Stephen R. Kellogg	Entrepreneur — YWC
		2		x	Lawrence Exp. Station	First research entity
		3	x		Henry L. Longest, II	Dir., Off. Emer. Rem.—Res. USEPA
		4		x	John C. Geyer	Johns Hopkins U.
1989	25	1			Grady B. Nichols	Electrostatic precipitators
		2			Arthur C. Stern	Mr. Air Pollution Control
		3			Frederick G. Pohland	Georgia Tech/U. Pittsburgh
		4			Roy F. Weston	Consultant — WESTON
1990	26	1	x		H. Gerard Schwartz, Jr.	Leader/ Pres., Sverdrup & Parcel
		2		x	George E. Symons	Editor, Water & Wastes Eng.
		3	x		E. Joe Middlebrooks	Leader/Professor
1991	27	1	x		Paul H. Woodruff	Consultant — ERM
		2		x	Earnest F. Gloyna	Professor — Texas/Leader
		3	x		Paul L. Busch	Leader/CEO Malcolm Pirnie
		4		x	Thomas R. Camp	Professor/Founder CDM
1992	28	1	x		Frank P. Partee	Air Pollution Control/Ford Motor
		2		x	Linvil G. Rich	Dean, Professor, Unit Processes
		3	x		Raymond C. Loehr	Leader/Professor
		4	x		San. Districts of LA Co.	Pioneer in Management, Treatment
1993	29	1	x		N. C. Vasuki	Solid Waste Management in Delaware
		2		x	Dale A. Carlson	Professor — U. Washington
		3	x		C. Joseph Touhill	Env. Engin./VP ICF Kaiser
		4	x		Ross E. McKinney	Mr. Activated Sludge/Professor
1994	30	1	x		John R. Stukenberg	Process Engineer/ Black & Veatch
		2		x	Joseph T. Ling	Mr. Pollution Prevention/3M
		3	x		Walter J. Weber, Jr.	Professor U. Mich./Adsorption
		4			Donald J. O'Connor	Modeling/Prof./Manhattan Col.

TABLE 1.
PROFILES IN ENVIRONMENTAL ENGINEER

Year	Vol.	No.	P	PH	Name	Background
1995	31	1	x		Louis L. Guy, Jr.	Leader/Consultant/Utilities Director
		2		x	Allen Hazen	Pioneer Sanitary Engineer
		3	x		H. Lanier Hickman	Mr. Solid Waste/EPA/SWANA
		4		x	Don Bloodgood	Professor/Purdue Ind. Waste Conf.
1996	32	1	x		Jeanette Semon	Stamford Water Pollution Control
		2		x	Earle Phelps	Potomologist
		3	x		Walter Bishop	Manager/Contra Costa Water Dist.
		4		x	Ellen Swallow Richards	First Woman Sanitary Engineer
1997	33	1	x		R. Rhodes Trussel	Consultant Process Innovator/MWH
		2		x	Ellis S. Chesborough	Sewerage for Chicago/1855
		3	x		Richard I. Dick	Professor/Cornell/Process fund.
		4		x	Boston's Env. Infrast.	300-Year Saga
1998	34	1		x	Philp Singer	Professor U. North Carolina/DBP's
		2	x		ORSANCO	Pollution Control/Ohio River
		3		x	Stephen P. Graef	Operations in WWT
		4	x		John S. Lagarias	Air Pollution Control
1999	35	1		x	Desmond F. Lawler	Professor at U. Texas/ particle fund.
		2	x		Gerard A. Rohlich	Professor/Wisconsin/Texas
		3		x	Jerald L. Schnoor	Professor/U. Iowa/Env. Modeling
		4	x		Norfolk Water Works	300 Years of Evolution
2000	36	1	x		H. David Stensel	Professor/U. Washington
		2		x	Harvey F. Ludwig	Dean of Consultants
		3	x		Garret P. Westerhoff	CEO/Malcolm Pirnie
		4	x		James E. Foxworthy	Professor/Loyola Marymount
2001	37	1		x	Dwight F. Metzler	Founder AAEE/ KDHE
		2		x	James F. Stahl	Manager/San. Districts of LA Co.
		3		x	L.D. McMullen	Manager/Des Moines Water works
		4		x	Jerome B. Gilbert	Leader/Manager/EBMUD
2002	38	1	x		D.W. (Rick) Ryckman	Professor/Consultant/REACT
		2	x		Murli Tonaley	CEO/MWH
		3	x		Francis A. DiGiano	Professor/U. North Carolina
		4	x		Hillel I. Shuval	Proessor/Hebrew U./Water Rec.
2003	39	1	x		Robert C. Williams	Chief Engineer/USPHS
		2	x		John D. Booth	Director/Palm Beach Solid Wastes
		3	x		Robert P. Stearns	Consultant/Solid Waste
2004	40	1	x		Cecil Lue-Hing	Biosolids-MWD of Greater Chicago
		2	x		William P. Dee	CEO/Malcolm Pirnie
		3	x		Don Schwinn	Nitrogen Man
		4			50th Anniversary	

The mission of the Academy was (and is) certification; this has included specifying certification criteria and procedures.

- Consulting Engineering: Time for Another Look At Conflict of Interest, Paul L. Busch, Vol. 32(3), 1996.
- Global Warming: A Primer, Paul M. King, Vol. 34(2), 1998.
- The Sanitary Engineer: A Changing of the Guard. Leonard B. Dworsky, Vol. 34(3), 1998. [Traces the history of the Sanitary Corps and his experiences in WWII.]
- How Environmental Impact Assessment Evolved to Become A Controlling Parameter, John Kelly and Harvey F. Ludwig, Vol. 34(3), 1998.
- Excerpts from the Environmental Engineering State-of-the-Industry Report, Farkas Berkowitz & Co., Vol. 35(4), 1999.
- The Early History of Disinfection By-Products – A Personal Chronicle (Part I), James M. Symons, Vol. 37(1), 2001.
- Raising the Bar – The Future of Environmental Engineering Education, H. Gerard Schwartz Vol. 38(1), 2002.
- New Academy Initiative: Local Chapters Brian P. Flynn, John Grosskopf, and Sandy Tripp, Vol. 39(2), 2003.
- Environmental Implications of Nanotechnologies, Mark R. Wiesner, Vol. 39(3), 2003.

For those issues that were controversial, if an article appeared that advocated one side a later article was likely to give the other side. To illustrate, an engineer of stature who took on the difficult topic of population was Mark D. Hollis, DEE, formerly Assistant Surgeon General, USPHS. Dr. Hollis wrote that "world over-population is the largest single threat to civilization" in an article, "The Environmental-Health-Population Syndrome" [Vol. 28(3), 1992]. A later article with an opposing view was entitled, "Defusing the Population Bomb" [Vol. 31(1),1995], by a fellow of the Center for the Study of American Business, Washington University, St. Louis.

A topic of widespread interest to the public and professionals world-wide was the 1992 Earth Summit at Rio. Robert M. White, President, NAS, wrote an article that was positive on the role of the conference in engineering [Vol. 28(2), 1992]. He stated that the summit would help define technology challenges, which should be integrated into a broad strategy to address the social and cultural issues of population stabilization and to preserve the "global-commons". Overall, the article was a blueprint for environmental engineering possibilities for the future. A complementary piece [Vol. 31(2) April 1995] by Raymond C. Loehr, DEE (2003 president) was "Protecting the Environmental Future: Looking Beyond the Horizon". In this

article, he summarized recommendations of the Environmental Futures Committee of the EPA Science Advisory Board, i.e., a national policy should be formulated to anticipate future environmental problems and to address them before they become major issues when they are cheaper to solve, rather than after the fact with solving them becomes inordinately expensive.

A feature of each issue was Bill Anderson's editorial, which was, usually, on a pertinent topic of the day and in some instances was complementary to one of position papers. A sampling of titles from some eighty issues is indicative of the breadth of topics and the nature of the essay, e.g.,

- National Conference on Specialty Certification on April 12-13, 1988. Vol. 24(1), 1988.
- Earth Day 1990. Vol. 26(2), 1990.
- Spin Control. Vol. 26(1) January 1990.
- To the Beach. Vol. 27(3), 1991.
- The Mother of All Summits. Vol. 28(3), 1992.
- Engineers, Providers, or Mechanics? Vol. 33(4), 1997.
- Four Years – Not Enough. Vol. 32(2), 1996. Guest Editorial by Daniel A. Okun.

The gist of the "Earth Day" editorial was that the environmental engineering profession no longer influences policy as it did up to 1970. The "Spin Control" essay was that global warming, a theory, had been accepted as fact and that the consequences of setting policies prior to rational analysis could result in much waste. The theme of the "To the Beach" editorial was that we can't afford to fix problems that don't exist, e.g., the supposed dioxin problem at Times Beach, MO. An article in the same issue by Vernon N. Houck, MD, asserted that a high dioxin load in human tissue does not cause cancer. In "Engineers, Providers, or Mechanics?", Bill brought out what many had felt but not articulated, i.e., that consulting engineering was no longer a profession, but a business operated to maximize profit. In one of two guest editorials, Daniel Okun noted that engineering is the only profession that accepts a bachelor's degree for practice and that engineers too often have played the role of technicians.

In Bill's editorial, "The Mother of All Summits", Vol. 28(3), 1992, he was critical of the Rio conference because: (1) real problems were banished to the summit's fringe, and (2) population growth, the root of all environmental problems, is a political minefield which was studiously avoided. On the other hand, he stated that the international treaties that were associated with the conference, whatever their faults, incorporated for the first time the notion that countries must consider the environmental consequences of their internal economic decisions.

In other words, Bill Anderson as Editor-in-Chief was not hesitant to take on any given issue relevant to the field and to stimulate thinking among the members of the Academy with pertinent and pithy editorials. As is evident, his bias as an engineer was in full view. [Many contend that readers may better evaluate an editorial if the bias of the writer is revealed.]

Bill brought out what many had felt but not articulated, i.e., that consulting engineering was no longer a profession, but a business operated to maximize profit.

The "President's Page" was another feature of each of the quarterly issues. Out of 80 issues over the past twenty years, a few are listed to give an idea of the nature of the topics covered, i.e.,

- More on ABET, President Joseph F. Lagnese, Jr., Vol. 27(4), 1991.
- Educating Tomorrow's Engineers, President Jerome B. Gilbert, Vol. 28(3), 1992.
- Environmental Engineering at A Crossroads, President: Robert C. Marini, Vol. 31(4), 1995.
- The Evolving Environmental Management Culture, President Roger J. Dolan, Vol. 32(3), 1996.

Its clear from the above titles and in perusing the contents of *Environmental Engineer* over the years that involvement in education was considered of major importance and was a part of the Academy's programs. Other issues included: the change in consulting practice from the engineer-owner-contractor to other forms brought on by globalization; certification as the primary mission of the Academy; prioritizing ancillary programs that support the primary mission; etc.

The *Environmental Engineer* was geared not only to provide a forum for ideas, but to inform the Diplomates of the affairs of the Academy with news of board meetings, the annual budget, outcomes of the Excellence in Environmental Engineering awards (started in 1988), selection of the Kappe Lecturer, recipients of individual awards, and news of Diplomates.

PRESIDENTS

The table on page 31 of this article lists the presidents of the Academy. All presidents have been accomplished professionals who have addressed the problems at hand and have projected the ideals of the Academy. Many, beginning with Earnest Boyce in 1956, have emerged to become recognized as historical figures in the field of environmental engineering.

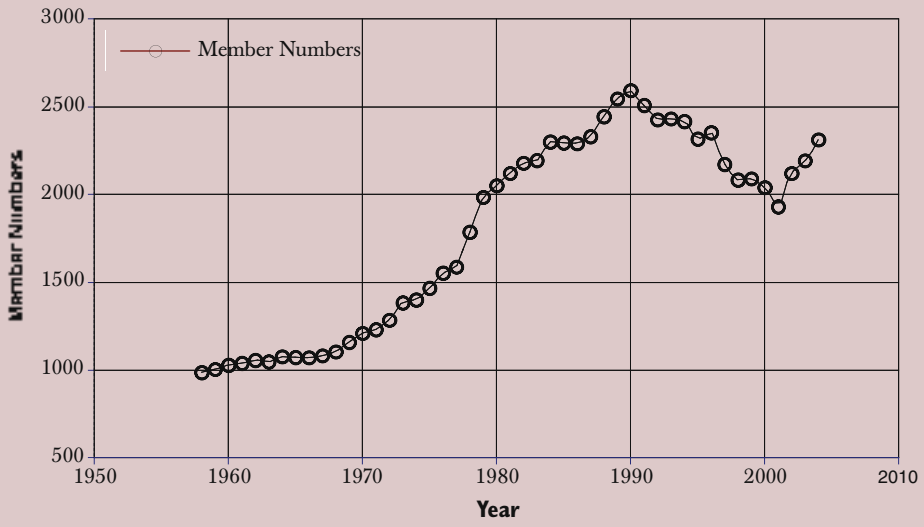
CHARACTER OF THE ACADEMY

As noted, the mission of the Academy was (and is) certification; this has included specifying certification criteria and procedures. As the Academy matured different member grades evolved, e.g., Active, Retired, Life, Honorary, Inactive, Life-Inactive. An, affiliate status was developed to provide for a relationship with the Academy for persons in the environmental engineering community who are not Diplomates; these include: Intern Environmental Engineers, Associate Environmental Engineers, Diplomate Emeritus, and Professor. The "intern" and "associate" classes were aimed toward younger environmental engineers who have met some of the requirements for certification but are not yet eligible to become Diplomates. The Academy has been aware that the average age of its membership is necessarily higher than most other organizations and that this characteristic has limited its numbers. Thus, the Board undertook an "active", *vis a vis* "passive", role to maintain its membership, such

TABLE 2.
PRESIDENTS OF THE ACADEMY

Year	President
1968	Albert H. Stevenson
1969	Herbert E. Hudson, Jr.
1970	Daniel A. Okun
1971	Harry P. Kramer
1972	Wesley E. Gilbertson
1973	Frank R. Bowerman
1974	Roy F. Weston
1975	Glen J. Hopkins
1976	Richard S. Green
1977	John D. Parkhurst
1978	James B. Coulter
1979	Frank A. Butrico
1980	William J. Carroll
1981	M. Donald R. Riddell
1982	George P. Hanna, Jr.
1983	Earnest F. Gloyna
1984	James J. Corbalis, Jr.
1985	Walter E. Garrison
1986	Leo Weaver
1987	Louis L. Guy, Jr.
1988	Paul L. Busch
1989	N. Bruce Hanes
1990	David M. Benforado
1991	Joseph F. Lagnese, Jr.
1992	Jerome B. Gilbert
1993	Frederick G. Pohland
1994	William H. Busch
1995	Robert C. Marini
1996	Roger J. Dolan
1997	Charles A. Willis
1998	E. Joe Middlebrooks
1999	John A. DeFilippi
2000	William C. Boyle
2001	Davis L. Ford
2002	Keith E. Carns
2003	Raymond C. Loehr
2004	Jeanette A. Brown
2005	Timothy G. Shea

FIGURE 1.
AAEE MEMBER NUMBERS



as seen by the "intern" and "associate" member classes, without compromising its requirements for certification.

To provide for public awareness of certification and its significance, the Academy has sponsored an array of programs including: acting as the lead in ABET accreditation for environmental engineering, developing membership grades, sponsoring the Excellence in Environmental Engineering awards, giving individual awards, etc. Engineering, *per se*, such as management, economic analysis of projects, design, has been the province of the sponsoring organizations and so the Academy has not stepped into such areas.

While environmental engineers with degrees, license, and experience have demonstrated competence, the certification process provides a formal confirmation by one's peers. The DEE suffix attests to the resulting certification. From the beginning, certification was modeled on that used by the medical profession, e.g., a physician may be "board certified" in ophthalmology.

The governing structure of the Academy is comprised of officers, a board of trustees, and an executive committee. Members of the board are nominated by the sponsoring organizations with three at-large members voted on by the membership. There are eight sponsoring organizations with one board member for each. The vice-president is also voted on, with two nominees selected by the Board. In general, the board members and officers have been persons who have exhibited leadership and have had prior recognition through professional activities. The officers and board set policy for the Academy, with administration by the executive director and the Academy staff. Much of the work of the Academy is done through committees, with members and chairs appointed by the president to serve three-year terms. The committees may recommend measures to the board that are pertinent to their respective charge.

CONTINUING ISSUES

Two continuing issues of the Academy have remained in the forefront over its fifty year history; these are: (1) sustaining and increasing membership, and (2) maintaining sufficient revenue to fund the programs that have evolved. Figure 1 shows the membership numbers from 1957 to 2003 and Figure 2 shows the total revenues of the Academy from 1973 to 2004. Since the membership and board prefer that membership fees be the primary source of revenue, the two are related.

Membership

The plot in Figure 1 shows a steady increase in membership from 1000 in 1957 to 2600 in 1990. From 1990 to 2001 the membership dropped to 1900, then increased to 2300 in 2004. An array of reasons have been ascribed for the Academy falling short of its membership goals. Most reasons relate to under-use of the credential in business, e.g., rewarding with higher salaries and promotions those employees who become Diplomates; using it to qualify employees for selection by a prospective client; using it, if a client (if an agency official), to select a consultant; using it to recruit employees; using it in brochures, public relations events, and media contacts; and finally, using the DEE suffix in every-day professional activities. In short, recognition of the credential

and the expectation that qualified engineers are associated with a firm, an agency, or a project, is incumbent upon those firms and agencies, and the individuals who comprise them, especially those in responsible charge, to use it as a part of everyday business. Those in academics could also make use of the DEE in the many opportunities provided, e.g., in catalog listings, contracts for research, discussions with students who may be interested in the field, in consulting engagements, etc.

The use of the DEE has been considered important since the first decade of the Academy as a means to achieve recognition of the credential. With only nominal use of the suffix in signatures, authorship, and professional identity, membership growth is retarded commensurately. The important role of the membership in developing recognition has been reiterated numerous times over the past twenty years by the executive director and by successive presidents. Another reason for the difficulty in increasing membership is that eligibility to take the certification examination is only after eight years of practice. Engineers with such experience are sometimes reticent, its been conjectured, to place themselves in the position of overcoming another barrier. By contrast, the examinations for medical specialties follows the respective residencies.

On the other-hand, several factors have contributed to what seems to be an increasing recognition of certification, and include: (1) long-term sustained visibility of the Academy and its programs, (2) a few public agencies have adopted a policy that board certified persons be involved in their projects, (3) certain consulting firms have emphasized board certification for their staff. [Two examples of public agencies (among a number) that have embraced Academy certification have included: (1) the Sanitation Districts of Los Angeles County who have endorsed it for its own engineers and as a qualifier for its consultants, and (2) the Mississippi Department of Environmental Quality has used it as a qualification for merit salary increase. Some consulting engineering firms have also embraced certification and have had long-term involvement with the Academy. One of the major firms has, in fact, over 120 Diplomates on staff. A reason is that the principals, dating from the founders, have emphasized the values of certification.] As a final point, which may be either peripheral or direct appeal, salaries have been shown to be higher for Diplomates, other factors being similar.

The greatest appeal and benefit of certification, however, is that those offering services to others have been provided an independent appraisal of their capabilities. Board certification is a credential increasingly recognized by clients and valued by the engineering community.

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Revenue

Figure 2 shows three sources of revenue: (1) fixed income from fees and other sources, seen as the lower plot; (2) contracts, seen as the difference between the upper plot and the middle plot; and (3) the sales of books, seen as the difference

MAINTAINING NUMBERS OF DIPLOMATES

The issue of increasing numbers of Academy Diplomates has been tied to the kinds of professional values that have been evolving in the United States since the early 1980's based on the seeds sown in the early 1970's. From about the early 1980's, environmental engineering firms have been increasing in size both through growth in the overall market for services and through consolidation. As engineering firms were acquired, the CEO's of smaller and medium-sized organizations were often retired as part of the process and the new company placed less, if any, emphasis on credentials. As those who grew up with the profession in the 1950's and 1960's were succeeded by younger persons; the latter (by and large) did not have the same focus on professionalism as their predecessors. Their organizations, with all of the competitive pressures and boards that were more remote from the day-to-day operations, were necessarily more focused on the "bottom-line". This was at odds with the traditional notions of consulting firms as the acme of the profession, e.g., protecting the public good, serving the best interests of the client, and developing personnel (mentoring, sponsoring attendance at meetings, encouraging papers, etc.) so that a cadre of younger engineers could be prepared to carry on the ideals of professionalism. [While facing these competitive pressures, many of the large firms that emerged did, through force of board and CEO influence, maintain their professional focus. The overall competitive atmosphere that developed has, however, resulted in less financial latitude for maintenance of professional values.]

Against this tide, aggressive efforts have been undertaken to increase the number of Diplomates, e.g., direct mail to recommended individuals, visibility of the Academy at trade shows, and encouraging the use of the DEE suffix. These efforts have been only modestly successful. Of these approaches, word-of-mouth and recommendations from colleagues remain the most effective.

In addition, in the mid-1990's, the Academy launched the Interns and Associates program in order to get young engineers involved with the Academy before they had a P.E. and the requisite eight years of professional experience. All of this in concert has resulting in an increase, since Year 2001, in the number of Diplomates, as seen in Figure 1.

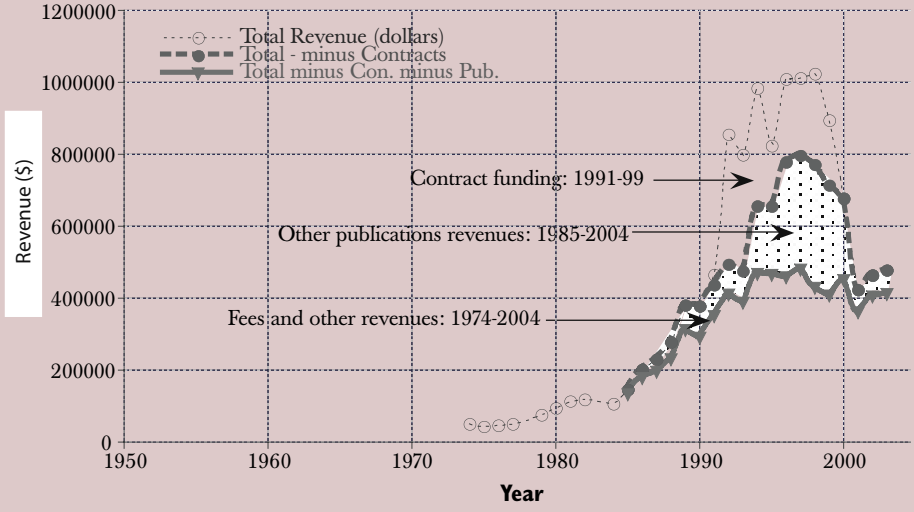
between the middle plot and the lower plot. As seen, the variable income of the 1990's added about $600,000 per year to the Academy budget. The contract activity was mostly for the development of a set of fifteen state-of-the-art manuals on innovative waste treatment technologies (with the acronym WASTECH). The success of the WASTECH project led to other contracts of a similar nature from the Department of Defense. The other enterprise was a book publishing and sales operation done through the auspices of the Environmental Engineering Bookstore. By 1999, the "bloom" was off hazardous wastes and contracts for similar work ceased. At the same time, book sales revenue was declining. As noted, the variability of each enterprise is seen by the upper two plot lines in Figure 2 (seen by subtracting the lower plot line from each, respectively).

The completion of contracts and the decline in book revenues, both seen in Figure 2, precipitated a financial crisis that the Academy struggled with as the 21st Century began. The Board made some difficult decisions, shedding programs it deemed not essential. What remained – the *Environmental Engineer*, *Who's Who in Environmental Engineering*, and *Environmental Engineering Selection Guide*, participation in ABET accreditation, and continuation of Excellence in Environmental Engineering coupled with certification and recertification – provided annual revenue of approximately $400,000. As discussed, this is seen as the lowest plotted line of Figure 2, which is the sustainable revenue, and is related to fees and membership.

The main revenue source was certification fees, which amounted to about $250,000 annually. It was this source that gave the Academy its independence.. The $250,000 income almost covered operating expenses of salaries, office expenses, and legal and accounting fees. Most of the other expenses (e.g., *Environmental Engineer*, publications, meetings and seminars, public education, the Kappe lecture, etc.), were revenue generating, which approximately zeroed out the other $150,000 portion of the budget (the data cited were for 2001).

The revenue sources were an important consideration of the membership and the Board. The continuing goal was that the Academy should not seek revenues from sources that could compromise this independence.

FIGURE 2.
AAEE REVENUE FROM 1973



RECENT ISSUES

Education, consulting practice, and laws and regulations have changed a great deal over the past forty years, i.e., since about 1964. These changes are related, as discussed in this section. In addition, the Academy's program has evolved, as have the substantive issues that define the field. Emphasis here is on the past twenty years.

Accreditation

It was in 1962, following the 1960 Harvard Conference (see Part I) that the first two environmental engineering graduate programs were accredited. The number of programs accredited grew soon to ten but has remained the same over the years, i.e., about ten, out of about 100. Two reasons for the low numbers are: (1) many academics feel that accreditation would diminish their freedom to offer their own unique program (albeit most are similar in content and standards), and (2) the ABET Board, at the urging of its Engineering Dean's Council, does not permit dual level accreditation, i.e., for undergraduate and graduate degree programs with the same name. This rule has resulted in at least a few graduate programs that have not moved into the accredited column.

In addition, many undergraduate programs in environmental engineering have emerged over the past decade. At the same time, ABET accreditation has changed, with Academy involvement, to become "outcome-based", *vis a vis* specifying courses. As in decades past, some in practice currently have advocated what is essentially "vocational-training" in universities in which the graduate functions as a technician. This approach is at variance with what is done presently, i.e., trying to graduate an "educated" person with the potential to become a professional engineer and with the associated capacity for life-long learning. Also, as seen in issues of *Environmental Engineer*, (and in *Civil Engineering*) the four-year bachelor's degree as a basis for entering professional practice has been supplanted with calls for a five-year degree program that would end with a master's degree. A five-year program would, in fact, be more consistent with the five or six years required for diploma in universities in many foreign countries. [Regarding undergraduate degrees in environmental engineering, the "dam was breached" several years ago after decades of controversy. One of the reasons for the reticence of educators was that an undergraduate degree was perhaps too specialized.]

Education

As related to being "educated", and a five-year program, environmental engineers are expected to be more than just technically qualified. Any project is expected to fit the social, economic, ecological, esthetic context of the environment at hand; the engineer is expected to know enough about these areas to interface with other professionals. [Writing and speaking are the continuing requisite capabilities for engineering but may not be assimilated in school, an eternal lament of engineers in practice and known

by all (except the current students).] All of these qualities are expected of a professional in the field. Education can give a basis but continuing development must occur through practice. Mentoring in younger years, assimilation of ethical values, exposure to leadership models, assignment of management responsibilities, and being given opportunity for quality experiences are also a part of the equation of professional development.

Practice

Consulting practice, the second issue mentioned, has changed from the traditional engineer-contractor-owner relationship, in which bidding for jobs and advertising by professionals was unethical. This change (to codes of ethics of professional societies) was mandated in 1972 by the US Justice Department, based on anti-trust laws, and were adopted reluctantly and enforced by consent decree (by ASCE for example). By the 1980's some consulting engineering firms began to affiliate with construction companies and also developed operations capabilities. About the same time acquisitions or mergers occurred and by about 1990 the international mega-firm had become established. At the same time, some clients began to ask for bids for engineering services or for a lumped contract (e.g., for design, build, operate, own) and, in effect, became "customers". Smaller operating margin, and a change in the engineer-client relationship resulted eventually in some fraction of engineering services being "commoditized". Adding to this, water companies that formerly served London and Paris were privatized and became or were assimilated by conglomerates (e.g., in 1988 the Thames Water Authority became Thames Water and the General Water Company in Paris became a world-wide company for engineering services, research, equipment, contracting, operation, and owning facilities, later being owned by a conglomerate). By the mid-1990's these companies had evolved to offer "one-stop shopping", which was enticing to many utilities, especially in less-developed parts of the world (and even in the USA, utilities wanted to listen to this new form of services). In effect, a "walmartization" of the water utilities industry became an option available to the "owners", e.g., utilities, who hired engineers.

Its within this changing (*vis a vis* evolving) context that certification has had to adapt. A conglomerate corporation is less likely to pay attention to and value certification than is a traditional professional firm. Its more likely that the goals of the corporation will dominate individual values, *vis a vis* the ideals of professionalism (see also Sidebar 2). [Although many US firms have consolidated and grown in size, some have retained their traditional values (e.g., as evidenced by attendance of recent graduates at meetings, involvements of their young engineers in professional societies, papers presented by young engineers, numbers of principals and staff engineers in the firm who are Diplomates, etc.). Some have even refused to participate in the bidding process, even foregoing involvement with certain clients who insist on bidding. The smaller firms, e.g., those less than 100 persons, have also been subject to the same competitive pressures, but have had more discretion due to being owner-managed. Canadian firms have, to an even larger extent, retained their professional attributes. But in projects world-wide, the US firms have had to meet a competition that is quite different than in the USA.]

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Within this context of a large variety of forms of engineering-contractor-owner relations, it is only the sophisticated "owner" (the traditional designation for a client) that recognizes and desires professional services – and the associated benefits of certification. This is compounded by engineers being supplanted, since about 1980, in administrative/ management positions in major utilities. Thus certification has functioned in a practice context different each decade since about 1980, but has remained true to its mission and, at the same time, maintained and promoted professional ideals. [As stated, the Academy has modeled its certification program on that of the medical profession. Physician's themselves, however, have been subjected to the same kinds of influences that have exerted change on the engineering profession. Some physicians are doing what would have been unthinkable just a few years ago, i.e., advertising. Many are being subject to price reduction for services. They may be subject to being reversed on medical recommendations that would benefit a patient. Hospitals may be, in fact, owned by conglomerates, represented by a high-salaried non-medical administrator whose job it is to minimize costs and increase profits. The physician may be called a "health-care provider", functioning essentially as a technician. Despite these trends, most physicians have remained true to their professional ideals (as have engineers and as have many of the large engineering firms as well as small ones). While it could be construed as self-serving, one might conjecture that the numbers of Diplomates in a firm might be considered an index of its professionalism, if a client is looking for professional services, *vis a vis* a commodity.]

Regulations

Markets for engineering services have been created by the laws and regulations over the past forty years. At the same time, the ensuing regulations have sometimes mandated solutions that were over-kill with respect to problems, leaving less latitude for the application of engineering judgment and perhaps more economical approaches. These have not, however, influenced certification questions.

Internal Issues

Recent internal issues that have been addressed by the Academy to strengthen its programs include:

(1) Adding (in 1999) the requirement for continuing education as a condition for maintaining certification. [This change resulted from the comprehensive examina-

tion of Academy programs spear-headed by a former president, Joe Lagnese. It was adopted in 1995 and phased in over a 4 year period. After 1999, it was mandatory for Diplomates to obtain continuing education to continue their certification. Presently, about 25 states require continuing professional development (CPD) for maintenance of the PE license. Adoption of the CPD requirement as a career obligation was consistent with trends in the engineering community as well as with other professions.]

(2) Promoting certification of specialists of all types in engineering and technology. [The Academy long ago realized that if it was the only specialty using certification, it would be hard to have other professional groups accept it. This is the reason it joined with other organizations in 1990 to form the Council of Engineering and Scientific Specialty Boards (CESB). CESB is responsible for accrediting certification programs in engineering and technology. By accreditation, it assures the public, employers, and individuals that the certification offered by an organization is legitimate and is conducted in accordance with regularly accepted credentialing practices. This was intended to counter the emergence of supposed certification boards intended primarily for profit, i.e., "diploma mills".]

(3) Continuing involvement with AEESP in the periodic (e.g, at 3-7 year intervals) conferences on environmental engineering education. [The actual cooperation between these two organizations, i.e, AAEE and AAESP, has declined steadily since 1986. Recent conferences have been held with little or no Academy involvement, albeit historically AEESP and AAEE have been quite close and have some of the same roots. The first conference in 1960 was, in fact, solely Academy sponsored, being prior to AEESP (as noted in Part I); hence a continuing relationship is natural and sought.]

(4) Examining the avenues for certification. [The rigorous route to the DEE requires a PE license, eight years experience, a written exam, and an oral exam. Less rigorous routes have been available, however, and is an issue that the various Boards have faced from time to time. They have not endorsed a change toward increased rigor, however, since a trade-off could be that membership could decline below the critical number to sustain the needed revenue. By the same token, the members and Boards in the past have shown that they do not wish less rigor.]

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(5) Maintaining relationships with sponsoring organizations. [This has been an ongoing concern since the Academy's earliest days. Partly, the issue has been a normal one of the changing presidents and boards of sponsoring organizations becoming familiar with the Academy, with only a short time for developing a rapport. Thus, ties have depended to a large extent on Academy members being involved with the respective sponsoring organizations. A perceived pseudo issue that has surfaced from time to time since the inception of the Academy is that the relationships with sponsoring organizations was, by nature, competitive rather than complementary. This has always been proven to be a non-issue, albeit some will not agree. A few of the sponsoring organizations have been, in fact, especially close to the Academy; probably this has been due to mutually involved Diplomate/members. Thus, in addition to role of Diplomates in sponsoring organizations, the Academy has taken an active role in trying to maintain and enhance the relationships with sponsoring organizations.]

Our Evolving Field

Substantive issues have also been evolving. In most cases, the field has expanded, e.g., hazardous waste management in the 1980's (after CERLA), with traditional specialty areas not diminishing. Some of the global issues, e.g., accumulation of greenhouse gases in the atmosphere, deforestation, loss of wildlife habitat, etc., could define new markets. The greenhouse gas issue has resulted in an international treaty and other global issues could result in treaties. The countries signing a given treaty then develop their own laws and regulations to implement the terms. Although not evident at this time, new markets could develop. Some may involve creation of new technologies in which manufacturer's and mechanics are involved in implementation, e.g., as related to air pollution control or designing a recyclable car. But the issues are not clear at this time. Whatever evolves, the education system may be required to respond in ways that are not evident now.

SUMMING UP — WHAT CAN BE SAID ABOUT THE ACADEMY

In 1970, Robert Townsend, president of Avis, asked an advertising agency to determine how to communicate the attributes of the company. After spending some months poring over reports, talking to employees and customers, and reviewing its history, the agency said, simply: (1) you try hard, and (2) you are number two. Looking at the record of the Academy and knowing some of its membership, a similar kind of "sizing-up" results in observations as follows:

- The membership, officers, trustees, executive directors, and staff, and the founders, have been dedicated professionals. They have seen certification as a part of offering quality professional services.
- Integrity has been a prime characteristic of individuals associated with the Academy.
- The officers and boards have been professionals at the highest level who have projected an exemplary image to the public, furthering the ideals of the Academy.
- Certification is being accepted by some clients and is growing as a

condition for engaging firms.

- The Academy has been and remains a viable certifying organization. Its role in the profession has been institutionalized.
- While many clients are aware of the Academy and its membership, the general public has essentially no knowledge of environmental engineering as a profession.
- Environmental engineers began to lose policy influence after about 1970.
- In public agencies, e.g., regulatory, utilities, authorities, engineers have been replaced increasingly over the past thirty years by persons from other fields.
- The Academy is committed to continuation of its basic mission of certification as envisaged by its founders. Also, certification has involved supporting functions of continuing education and enhancement of image and knowledge of the role of environmental engineers in society.

Beyond certification, the founders had envisaged an organization that would improve practice and advance the cause of environmental engineering. By 1985 the Academy had become a "mature" organization fulfilling most of these goals. By 2005, the Academy was one of the visible and prominent institutions within environmental engineering.

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ACRONYMS AND TERMS

AAEE – American Academy of Environmental Engineers

ABET – Accreditation Board for Engineering and Technology

Academy – American Academy of Environmental Engineers

Board – Board of Trustees, American Academy of Environmental Engineers

CESB – Council of Engineering and Scientific Specialty Boards

DEE – Diplomate Environmental Engineer

DoD – US Department of Defense

DOE – US Department of Energy

EPA – US Environmental Protection Agency

WASTECH – Pronounced waste-tech; designation for an Academy managed project started in 1992 and completed in 1998 which produced fifteen books on topics: bioremediation, chemical treatment, stabilization/solidification, solvent/chemical extraction, thermal desorption, thermal destruction, vacuum/vapor extraction, etc. The project involved 200 experts, 9 professional societies, and 3 government agencies, i.e., EPA (lead agency), DoD, DOE.

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