



Association of
Environmental
Engineering
Professors

Newsletter

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PRESIDENT'S CORNER

DEAR FRIENDS AND COLLEAGUES:

As environmental engineers and scientists, we enjoy the proverbial blessing of living in interesting times, with much societal attention and many resources focused on the very issues that our profession exists to address. We also suffer two maladies commonly associated with interesting times; Bill Glaze identified them in his recent (Feb., 1995) ES&T editorial: information overload and growing complexity.

In these interesting times, AEEP has a responsibility to help our members and our profession to: 1) maximize the benefits to society derived from the resources under our control or influence; 2) find effective ways to manage an exponentially increasing amount of information; and 3) assess the ability of our organizational structures to function **effectively in more** complex settings. To these ends, AEEP and our committees and members have been engaging in discussions and activities on many fronts, addressing scales ranging from local to global.

AEEP'S GLOBAL ROLE

Our proper role in a global society, an issue raised in Lawrence Wang's letter to the editor (page 3) continues to be actively discussed. Several years ago the Board, in consultation with the AEEP Bylaws Committee, determined that AEEP could best serve our members by focusing on environmental education as conducted in North America, while continuing to affiliate and cooperate with comparable associations in other regions. Overseas travel, differences in educational systems, and the existence of other organizations having similar interests were among the complexities considered. The decision was not unanimous.

By offering Affiliate Membership to professors located outside North America, AEEP provides important opportunities for global communication and cooperation; and, through the activities of our members and our students, AEEP globally impacts environmental engineering education and practice. AEEP's commitment to international cooperation is also exemplified by our participation, through USANC, in IAWQ; by our strong representation on IAWQ's Environmental Engineering Education (E³) Specialist Group (Tom Keinath, former AEEP President and current IAWQ President, was instrumental in establishing this group, which is co-chaired by former AEEP President Paul Bishop); and by recent efforts to revitalize the AEEP Latin American Initiatives Committee under the leadership of Bruce Thomson.

AEEP should continue to examine its global role, and should be prepared to lead or assist in international efforts,

especially those offering our members increased opportunities for service. It might be appropriate, at some point in time, for AEEP to form, or participate in the creation of, a truly global AEEP. There are some among us who believe this time has already arrived.

OTHER BIG-PICTURE ISSUES

Other issues being addressed by AEEP and our committees and members include: the adequacy, effectiveness, and structure of the professional organizations representing our field as it evolves and matures; the proper basis for environmental regulations; support for student environmental organizations; and effective use of the opportunities offered through electronic communications.

In January, the Executive Committees of AAEE and AEEP met to discuss the upcoming Conference on Environmental Engineering Education and a range of other issues, including all of those mentioned above. We agreed to appoint a task force to explore and recommend ways to enhance cooperation to achieve shared goals. To facilitate communication and promote cooperation between our two organizations, AAEE offered to explore, with our assistance, the possibility of providing copies of their magazine, *Environmental Engineer*, to AEEP members who are not members of AAEE and to student environmental organizations.

Debate continues regarding the definition of environmental engineering, the need to create our own founder society, and how best to include environmental scientists in the professional societies representing our highly interdisciplinary field. AAEE and other organizations are also struggling with these issues. If you have not yet done so, be sure to read the editorials in the March issue of the *Journal of Environmental Engineering* (ASCE), reflect on them, and then decide:

- Do you agree with Aarne Vesilind that "environmental engineers are a different breed, ... [that] environmental engineering is a calling, [and that] it is high time we formed a professional organization that reflects that calling?"
- Do you agree with Henry Derr that, like the legal and medical professions, we should create an organization that limits access to the profession and increases the quality of our membership?
- Do you agree with Paul Kuhn and many other members of ASCE that "the argument for more splintering when more interaction is essential seems to be a cross purposes with environmental engineers' needs, ... [and that] the system does not seem to be broken?"

• Or do you agree with Tom Theis that "there is at least one other model, [in which] environmental awareness, in its engineering or problem-solving sense, is incorporated in various ways into the traditional engineering fields directly?" I trust that there will be ample opportunity to explore and debate these and other important issues at the next Education Conference.

Robert Marini, President of AAEE, recently invited us to join AAEE and the other AAEE sponsors in encouraging the U.S. Congress to lay a new foundation for environmental policy decisions. The foundation would be based on four principles:

- 1) Rational environmental laws and regulations based on prioritized risks, proven science, and measurable performance standards are essential for ensuring ecologically sound environmental quality, human health, and quality living standards for all.
- 2) Market mechanisms that reward above-standard performance, innovation, waste avoidance, and energy conservation are critical for enabling compliance with environmental laws and regulations.
- 3) The needs of all stakeholders must be effectively integrated in developing consensus on regulatory limits and priorities. These stakeholders include the regulated community, the environment (as represented by its advocates), the implementers, the regulators, and the public.
- 4) A portion of the nation's financial resources must be committed to the research, development, and demonstration of the necessary science and engineering to undergird environmental policy and to achieve the desired environmental goals in the most cost-effective manner.

Please share your thoughts regarding this proposed policy with our Legislative Affairs Committee (chaired by Bill Batchelor) and members of the Board. In doing so, you may wish to consider Chuck Haas' recent editorial (*Water Envir. Res.*, Jan./Feb., 1995) making the case for avoiding over-reliance on risk assessment and cost effectiveness analysis.

You are also welcome to share your thoughts on the other issues noted above, including AEEP's global role, with your Board members, with Chet Rock (our Newsletter editor and

co-Chair of the next Conference on Environmental Engineering Education), and with our Long-Range Planning Committee (chaired by Bruce Logan). It is important that we maintain an active dialog. Although some may be frustrated by our slowness in taking action, we will be well served in the long run if we build consensus and make wise decisions.

COMMITTEE HIGHLIGHTS

Jim Alleman has agreed to chair our 21st Century Highway Committee, which will explore ways for AEEP to take advantage of modern electronic communications. Possibilities include an electronic newsletter, bulletin boards, use of e-mail to relay important notices (with proper safeguards against "junk e-mail"), an on-line Directory (perhaps with restricted access), and posting of textbook reviews and course syllabi. I anticipate that this committee will play a key role in helping us cope with "information overload" and facilitating communications with our counterparts around the globe. I encourage those of you with talents in this area to pitch in and help.

Robin Collins has agreed to chair our Register Update Committee. The next edition of the AEEP Register of Environmental Engineering Graduate Programs is tentatively scheduled to appear in 1996. Please send Robin your ideas regarding content and format. He is already exploring the possibility of putting the Register on a CD-ROM disk or making it available on-line.

Jim Mihelcic has agreed to chair a committee to establish, promote, and assist student organizations broadly interested in environmental engineering and science. The Board feels that this is a critical time for such action, and plans are being made to formally create a student member grade in AEEP. Please send Jim your comments and, most importantly, information about the student environmental organizations active on your campus.

AEEP is a great organization, and there are many exciting opportunities that lie before us. Get involved! If you have an interest in the work of a particular committee, contact the chair to offer your assistance. If you see a need we are not adequately addressing, please give me a call. If you are already contributing your time and effort, your continued support will be very much appreciated.

BEST REGARDS,
STEPHEN RANDTKE

AEEP NEWS AND ANNOUNCEMENTS

LAST CALL FOR AAEE NOMINATIONS!!!

AEEP has been notified that the Academy of Environmental Engineers, in an effort to strengthen its certification procedures, decided to eliminate certification through nominations by sponsor organizations effective December 31, 1995. During 1995, AEEP may nominate up to five more individuals for AAEE certification. If you would like to be nominated, please contact Greg Reed, AEEP's Liaison to AAEE.

Request for Syllabi

Teaching in the environmental engineering field is challenging, and many professors have responded by using new and innovative approaches in the classroom. In order to help professors at different institutions share their ideas on innovative courses, AEEP has formed a Syllabus Committee to help disseminate course outlines. If you are interested in sharing your course outlines with others, please mail a hardcopy and diskette containing the information (WordPerfect or ASCII format) to: Bruce Logan, Dept. of Chem. and Env. Engg., Bldg. 72, Rm. 306, University of Arizona, Tucson, AZ 85721. Course outlines will be compiled and handed out as a bound packet at the next AEEP conference.

Letter to the President and Editor "Global Thinking"

Since I am now serving on a UN mission in Vienna, Austria, I am temporarily disconnected from my American colleagues. In order to re-establish my connections, I managed to obtain a copy of Association of Environmental Engineering Professors Newsletter, Volume 29, No. 2, September 1994, from my friend. I was very much impressed by the wide international coverage in the September 1994 issue: (1) The American University in Cairo; (2) University of Alberta in Canada; (3) EWPCA International Conference in Portugal; (4) International Water Supply Association International Specialist Conference in Australia; (5) IAWQ Specialized Conference in Denmark; and (6) International Symposium on Wastewater Reclamation and Reuse in Greece. AEEP is an American association but serving entire planet of earth.

I would like to suggest that AEEP now evolve to become an international association by inviting university professors, environmental engineers and, environmental institutions around the world to be regular members, affiliated members and sustaining members, respectively. The association's name (AEEP), official language (English) and even headquarters (USA) may remain unchanged.

On behalf of the United Nations Industrial Development Organization (UNIDO), Industrial Sectors and Environment Division (ISED), I am seeking appropriate partnership with AEEP, and also inviting your participation in various UN initiated environmental activities, hoping that your association's precious human resources can be fully utilized for serving the international community especially the developing countries. An International Environmental Information Network could also be established under the joint auspices of AEEP and UNIDO/UNEP for disseminating information on environmentally sound technologies.

We are now inter-connected by fax machines and electronic mail network. Is it the time for us all to have a globe thinking?

Sincerely yours,
Lawrence K. Wang
Senior Advisor

Industrial Sectors and Environment Division
United Nations Industrial Development Organization

Deadline for September 1995

AEEP NEWSLETTER

Please submit articles for the
September
issue of the AEEP Newsletter to:
Chet A. Rock

University of Maine
Dept. of Civil & Environmental Engineering
5711 Boardman Hall
Orono, ME 04469-5711
NEW FAX#: (207) 581-3888
Phone (207) 581-2170
email - chetrock@maine.maine.edu
before Friday, July 28th.

ATTENTION: ALL ENVIRONMENTAL ENGINEERING PROFESSORS

The Air & Waste Management Association's Annual Meeting will be held in San Antonio Texas from June 18-23, 1995. A student program similar to last years will be conducted. Also, Ms. Cyndi Levesque, Student Program Chairman for the 1995 A&WMA Annual Meeting, would like to encourage **all of the AEEP members** to inform their students of this important event. She is planning many special activities just for students. These include trips to local plants and research laboratories, a student reception and job placement service, and a student poster session. Cash prizes will be awarded to those posters judged to be of the best quality, and if the 1994 Cincinnati Meeting is any indication of the amounts available, they hope to have about \$3,000-\$4,000 to award. Currently, the deadline for submittal of student abstracts is March 24, 1995, and the deadline for the accepted papers is May 10, 1995. For more information, please contact

Cyndi Levesque
City Public Service
P.O. Box 1771
San Antonio, TX 78296
Phone: 210/978-2875 FAX: 210/978-3012

Members on the move...

The University of Delaware's Environmental Engineering Program is pleased to announce that Dr. Daniel Cha, will be joining them in September 1995. Dr. Cha is a graduate of the University of California at Berkeley with research interests in biological process control. His title and address will be as follows:

Dr. Daniel Cha
Assistant Professor
Dept. of Civil Engineering
DuPont Hall
Newark, Delaware 19716

The University of Illinois is pleased to announce that Dr. Benito Marinas will be joining the Environmental & Science Engineering Program on June 1 of this year. Dr. Marinas received his PhD (1988) from the University of California at Berkeley and is currently a member of the environmental engineering faculty at Purdue University. His title and address will be as follows:

Dr. Benito J. Marinas
Associate Professor of Environmental Engineering
Department of Civil Engineering
University of Illinois
205 North Mathews
Urbana, IL 61801
Tel: 217/333-6961

"Aquatic Chemistry:

Chemical Equilibria and Rates in Natural Waters" Third Edition

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James J. Morgan, (AEEP Member), Marvin L. Goldberger Professor of Environmental Engineering, California Institute for Technology, Pasadena, CA

Contents -

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3. Acid-Base
4. Dissolved Carbon Dioxide
5. Atmosphere-Water Interactions
6. Metal Ions in Aqueous Solution: Aspects of Coordination Chemistry
7. Precipitation and Dissolution
8. Oxidation and Reduction; Equilibria
9. The Solid-Solution Interface
10. Trace Elements: Cycling, Regulation, and Biological Role
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"Chemistry for Environmental Engineers"

Perry McCarty, (AEEP member), Professor and Director, Civil Engineering Dept., Stanford University

Gene F. Parkin, (AEEP member), Professor and Chair, Dept. of Civil and Env. Engr., University of Iowa

Clair N. Sawyer

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McGraw-Hill, Inc., NJ (1994)

ISBN 054978-8, 608 pages

ISBN 054979-6 Solutions Manual

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Charles N. Haas (AEEP Member), LD Betz Professor of Environmental Engineering, Drexel University

Richard J. Vamos (PhD - IIT), DAI Associates, Chicago

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3. Overview of the Waste Management Problem
4. Physical Waste Treatment Processes
5. Chemical Waste Treatment Processes
6. Biological Treatment Processes
7. Thermal Processes
8. Waste Elimination Options
9. Systems Analysis for Regional Planning of Hazardous
10. Waste Management Options

Prentice Hall, NY (1995)

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"Process Dynamics in Environmental Systems"

Walter J. Weber, Jr. (AEEP Member), Maskew Fair and Earnest Boyce Distinguished University Professor, Department of Civil and Environmental Engineering, University of Michigan

Francis A. DiGiano, (AEEP Member) Professor, Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill

Table of Contents:

1. Overview
2. Process Characterization and Analysis
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7. General Ideas in Air Pollution Control
8. The Nature of Particulate Air Pollutants
9. Control of Primary Particulate Air Pollutants
10. Control of Volatile Organic Compounds (VOC)
11. Control of Sulfur Oxides
12. Control of Nitrogen Oxides
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McGraw-Hill, Inc., NJ (1994)

ISBN 061397-4, 576 pages

ISBN 061398-2 Solutions Manual

"Environmental Chemodynamics: Movement of Chemicals in Air, Water, and Soil"

Second Edition

Louis J. Thibodeaux, (AEEP Member), Jesse Coates
Professor of Chemical Engineering, Louisiana State
University; Director, Hazardous Waste Research Center,
Louisiana State University, Baton Rouge, LA

Contents -

1. Introduction
2. Equilibrium at Environmental Interfaces
3. Transport Fundamentals
4. Chemical Exchange Between Air and Water
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6. Chemical Exchange Between Air and Soil
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Michael D. LaGrega, (AEEP member), Professor, Civil
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McGraw-Hill, Inc., NJ (1994)

ISBN 019552-8, 1025 pages

BOOK REVIEW

"Environmental Engineering"

by **Bill T. Ray (AEEP Member)**

University of Southern Illinois, Carbondale

PWS Publishing Co., Boston, MA

Environmental Engineering, according to the Preface, is a textbook written for a sophomore or junior level general environmental engineering course. The book is intended for all engineering and audiences, including non-civil engineering majors.

What distinguishes this book from several others in the field is the inclusion of introductory chapters that cover aquatic chemistry and microbiology. In the chapter on physical chemistry, included are gas laws, chemical thermodynamics, stoichiometry, equilibrium chemistry and adsorption. The organic chemistry chapter includes a discussion of the carbon atom, hydrocarbons, oxygenated organics, nitrogenous compounds, halogenated organics, plastics, and organics of life and environmental concern. The microbiology chapter includes discussions of various microorganisms, metabolism, microbial disease, and microbial growth. Following these introductory chapters are discussions of water and wastewater treatment, air pollution control, solid waste management, and hazardous waste.

Of greatest concern for this reviewer is the "quick and dirty" way that many of the introductory topics are treated. It may be possible to use this material as a review for students who have a substantial background in the sciences, but for novices, it is a little too much to expect that they will understand Monod kinetics in a few pages of discussion, for example.

A second concern is that the level of presentation, as is noted in the Preface, is for sophomores and juniors. If sophomores do use this book, it is better for those sophomores who have already had fluid mechanics. Otherwise, some discussions, such as the use of Reynolds number, would pose difficulties. Care must be exercised by the instructor when using this book in a class that has students without a fluids background.

The book is full of pictures and diagrams to enhance reader interest, and the case studies are excellent. Bill Ray's writing style is open and easy to read, and the book is well organized. It should become a valued addition for introductory courses in environmental engineering.

P. Aarne Vesilind
AEEP Book Review Editor

EMPLOYMENT OPPORTUNITIES

Clarkson University

The Department of Civil and Environmental Engineering at Clarkson University invites applications for a tenure-track position as Assistant Professor of Environmental Engineering. Duties of the position include teaching at the graduate and undergraduate levels, and active participation in and continued development of an established research program. Applications from individuals with demonstrated scholarly expertise in any of the recognized areas of environmental engineering, including environmental fluid mechanics, physical, chemical and biological process control, hazardous waste management, environmental systems analysis, air pollution control, and waste minimization, are encouraged to apply. The Ph.D. degree is required and eligibility for professional licensure will be a consideration during candidate selection. Review of applications will begin immediately and will continue until the position is filled. Send a current resume plus the names and addresses of at least three references to: Environmental Engineering Search Committee, Department of Civil and Environmental Engineering, Box 5715, Clarkson University, Potsdam, NY 13699-5715. Please refer to position number 509.

*Clarkson University is an
Affirmative Action/Equal Opportunity Employer.*

Harvey Mudd College

Applications are invited for the position of **Parsons Assistant/Associate Professor of Environmental Engineering**. The position is a tenure-track position with initial funding from the Ralph M. Parsons Foundation. Candidates should combine a **dedication to teaching with strong research interests**. Preference will be given to environmental engineers with a background in the relevant physical, biological or chemical processes underlying their work, who are interested in teaching engineering science and design courses in a broad, unspecialized, undergraduate program. Harvey Mudd College, one of the six Claremont Colleges, is a small, top ranked college of engineering and science that offers a unified BS in Engineering, as well as a professional Master of Engineering degree for a few of our own graduates. The department also has strong research and design programs, some involving joint activities with major universities and corporations in southern California. The candidate can expect to lead the development of new courses in environmental engineering, teach engineering science core courses, and supervise projects in the Engineering Clinic. Applications will be reviewed beginning on March 15. Send resume (including an email address) and the names of three references to Clive L. Dym, Department of Engineering, Harvey Mudd College, Claremont, CA 91711. For email inquiries: clive_dym@hmc.edu

*Harvey Mudd is an equal opportunity employer
and particularly encourages applications from women and members
of minority groups under-represented in engineering.*

Howard University

National Search for Candidate for **Samuel P. Massie Chair of Excellence**. The Howard University School of Engineering is seeking a well-qualified, creative individual to fill the Dr. Samuel P. Massie Chair of Excellence in Environmental Engineering. The Chair is funded for five years and may lead to a tenure-track position at the professor rank. Dr. Samuel P. Massie, one of the Nation's outstanding scientists and educators,

recently retired from the US Naval Academy. The Massie Chair was established by the Department of Energy (DOE) in collaboration with Advancing Minorities Interest in Engineering (AMIE) and its Fortune 500 corporate affiliates. The Chair must be filled by a leading scientist/engineer whose background is relevant to the established goals of the DOE/AMIE initiative. The multidisciplinary research at Howard upon which the incumbent will focus includes: (1) environmental restoration or waste management; (2) bioremediation of hazardous wastes; (3) modeling of contaminant transport and behavior, and (4) thermal treatment of hazardous wastes. Environmental programs and research are well-established in the Departments of Civil and Chemical Engineering. Howard is a member of the Great Lakes and Mid-Atlantic Hazardous Substance Research Center, a consortium consisting of Howard (Departments of Biology, Chemistry, and Civil and Chemical Engineering), The University of Michigan and Michigan State University. Qualifications: applicants for this position must have a B.S. in chemical or civil engineering and hold the earned doctorate in civil or chemical engineering; possess outstanding credentials in research and education in the field of environmental engineering; a strong background in at least two out of the four research focus areas, and the ability to coordinate and/or supervise research projects in any of the identified areas. The applicant's record of accomplishment should include publications and presentations. A broad spectrum of skills including the ability to inspire and harmoniously guide administrative personnel, faculty, research associates and students are prerequisites. To apply: applicants must be US citizens or permanent residents. Interested individuals are encouraged to submit a curriculum vitae, and the names/addresses/telephone numbers of at least three references to Dr. James H. Johnson, Jr., Chairman/National Massie Search Committee, School of Engineering, Howard University, Washington, DC 20059. Telephone: 202/806-6565. Finalists will be asked to prepare a statement of vision including proposed innovative activities for the Chair and present a lecture to the faculty of Civil and Chemical Engineering, the DOE representative of the Massie Search Committee, and students of the graduate seminar program. Applications will be received, and the selection process will continue, until a suitable candidate is identified.

Purdue University

The School of Civil Engineering at Purdue University invites applications for a tenure track faculty position established within the school's environmental and hydraulic engineering area. It is anticipated that this academic year position will be filled at the assistant professor level. The candidate must have a Ph.D. degree specializing in environmental or hydraulic engineering or closely related field. Expertise in any subdiscipline of environmental science and engineering will be considered. The existing twelve faculty in the area have specific research and teaching interests within the broader topics of: potable and wastewater treatment, soil and groundwater remediation, air pollution control, environmental chemistry and microbiology, hydraulics, watershed and subsurface hydrology, and coastal and ocean engineering. The successful candidate is expected to take a strong initiative in the development of externally funded research and in the publications of research results in peer-reviewed journals. Further responsibilities will include teaching current undergraduate and graduate courses and developing new course offerings.

For full consideration, please send a letter of research and teaching interests, detailed curriculum vita, and the names addresses, and phone numbers of three references to: Vincent P. Drnevich, Professor and Head, School of Civil Engineering, 1284 Civil Engineering Building, Purdue University, West Lafayette, IN 47907-1284. Initial review of applications will commence in mid-March and continue until the position is filled with the anticipated starting date to coincide with the 1995 Fall term.

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affirmative action employer.*

Rensselaer Polytechnic Institute

The Department of Civil and Environmental Engineering invites applications for a tenure-track position in environmental engineering. The position has been approved at the Assistant Professor level with salary commensurate with qualifications and experience. An earned Ph.D. in Environmental Engineering, Civil Engineering, Nuclear Engineering, Chemical Engineering, or a related field and professional registration, or the ability to obtain same, are required. As the first program to offer both an ABET accredited BS in environmental engineering and a Ph.D. in Environmental Engineering, Rensselaer maintains a commitment to excellence in teaching and research. In particular, we seek an individual with expertise in the application and modeling of physical, chemical or biological methods for the solution of environmental problems. Emphasis on the remediation of soils, sediments and groundwaters at toxic waste sites will be considered a plus. Candidates must show evidence of research accomplishment, ability to attract substantial external support, and plans for a productive research program together with a sustained commitment to undergraduate and graduate teaching.

Applicants should send a resume, the names of four references, and a statement of research and teaching interests and capabilities to: Dr. George List, Acting Chair, Civil and Environmental Engineering, Rensselaer Polytechnic Institute, Troy, NY 12180-3590. Applicants will be accepted until the position is filled.

Rensselaer Polytechnic Institute, an equal opportunity-affirmative action employer, particularly encourages applications from women and minority candidates.

University of Idaho

The University of Idaho is expanding its engineering program in Boise, Idaho and invites applications for one or more tenure-track faculty positions in the Department of Civil Engineering for the fall semester 1995. All academic ranks will be considered. Applicants with specialty in the areas of engineering management, structures (preferably timber design), environmental and transportation engineering are especially invited to apply. Qualifications for the positions include an earned Ph.D. in an appropriate subdiscipline with at least one degree in civil engineering, professional experience, the ability to communicate effectively, and teaching and research ability. Preference will be given to applicants with previous teaching and research experience, and the ability to effectively work with the professional community. Successful applicants will also conduct research, supervise graduate students, and assist in the ongoing development of the curriculum to support the program. The University of Idaho is the land-grant university

of Idaho and has statewide responsibility for engineering education. The main campus is located in Moscow, with branch programs in Boise and Idaho Falls. Boise is a growing city in southwest Idaho with a regional population of 225,000. The area boasts numerous Fortune 500 and smaller industrial firms that manufacture a variety of goods from microelectronics to food products. Faculty are sought who can work cooperatively with engineers from regional professional community and government on both fundamental and applied research opportunities. Faculty can also participate in the Engineering Assistance Center that provides technology extension services.

Applicants should submit a curriculum vitae, a statement of both teaching and research interests, and the names of four references to Dr. Howard Peavy, Search Committee Chair, Department of Civil Engineering, University of Idaho, Moscow, ID 83844-1022. Applications will be accepted until March 1, 1995 or until suitable candidates are selected.

To enrich education through diversity, the University of Idaho is an equal opportunity/affirmative action employer.

University of Illinois/ Urbana-Champaign

The Department of Civil Engineering at the University of Illinois at Urbana-Champaign is seeking candidates to fill a position in its Environmental Engineering and Science Program, because of the planned retirement of one of our senior faculty, John T. Pfeffer. The approved advertisement for this position indicates that we are looking for an individual focussing on "applications of virology and microbiology to environmental engineering problems; physical, chemical, or biological aspects of water quality control." We are especially interested in individuals who apply engineering fundamentals to biological treatment processes and who will establish a strong research program in areas such as: disinfection of waterborne pathogens (including bacteriology, virology, and protozoology); biological processes for treatment of wastewater, groundwater, contaminated soils, solid wastes, or hazardous wastes. The position is for a tenure track appointment at the assistant professor level or higher. Faculty in the Environmental Engineering and Science Program teach at both the undergraduate and graduate levels. Currently, we have eleven full-time faculty and three affiliate faculty that share these teaching obligations and supervision of one-hundred graduate students. Incoming faculty would be expected to teach at both levels, and would have the opportunity to develop new courses in their area of expertise. Applicants must hold, or be completing by December 1995, an earned doctorate in Civil Engineering or an appropriate engineering or science field. Salary and rank are open and will depend on qualifications. The proposed starting date is August 21, 1995. For full consideration, applications should be received by April 28, 1995. Applicants must indicate that they are applying for the position in the Environmental Engineering and Science Program. Letters of application, and the names, addresses, and telephone numbers of at least three references should be addressed to: Professor Neil M. Hawkins, Head, Department of Civil Engineering, University of Illinois at Urbana-Champaign, 1114 Newmark Civil Engineering Laboratory, 205 North Mathews Avenue, Urbana, IL 61801-2352, 217/ 333-3814.

*The University of Illinois is an Affirmative Action,
Equal Opportunity Employer.*

University of Maine

The Department of Civil and Environmental Engineering invites applications for a tenure track position in the area of Environmental or Geoenvironmental Engineering beginning September, 1995 or January 1996. Candidates must hold a doctorate in Civil or Environmental (or related) Engineering and have baccalaureate training in engineering from an accredited university. Responsibilities include undergraduate and graduate teaching in the areas of hazardous waste, biochemical waste treatment, and contaminant bioremediation. Active participation in externally funded research in the environmental engineering field is essential. Appointment rank will be commensurate with qualifications. The successful candidate must have authorization to work in the United States at the time of appointment and is expected to become a registered professional engineer in Maine. Applications, including resume, transcripts of academic work, teaching and research interest areas, publications list, and names of three references, should be sent to Dr. Chet A Rock, Chair, Department of Civil and Environmental Engineering, 5711 Boardman Hall, University of Maine, Orono, ME 04469-5711. For inquiries, call (207) 581-2170. Applications will be received until the position is filled.

The University of Maine is an equal opportunity/affirmative action employer and welcomes applications

The University of Michigan

The University of Michigan Department of Civil & Environmental Engineering invites applications for a Postdoctoral Research Fellow beginning June 1995. Research responsibilities will focus on experimental investigations of subsurface remediation, multiphase flow, and bioavailability of sorbed contaminants. The candidate should be highly motivated and have extensive experience with both batch and column systems. Knowledge of analytical techniques including gas and liquid chromatography, liquid scintillation counting procedures, and surface area analysis is required. Ability to interface with numerical modelers will be essential. A Ph.D. in environmental engineering, chemical engineering, or related field is required at the time of appointment. The position will be for a period of two years, with salary to be determined based on experience. Send curriculum vitae, recent publications, and the names and addresses of at least three references to: Dr. Linda M. Abriola, Department of Civil & Environmental Engineering, 181 EWRE Building, The University of Michigan, Ann Arbor, MI 48109-2125, 313/764-9406 or email: Linda_Abriola@um.cc.umich.edu (Please respond only to the e-mail address given here.) Applications will be accepted until the position is filled.

The University of Michigan is an equal opportunity, affirmative action employer.

ON-LINE INFO

ACCESSING UWIN AND WATERTALK

The Universities Water Information Network (UWIN) was established by the United States Geological Survey (USGS) and the Universities Council on Water Resources (UCOWR). UWIN's main objective is to facilitate information dissemination throughout the water resources community. We seek to bring water to the information superhighway and the superhighway to water professionals. UWIN contains information on:

- water resources expert directory
- WRSIC water-related research abstracts since 1967
- calendar of water events
- employment listings
- graduate education guide
- UCOWR directory
- water organization directory
- WaterWiser, the Water Conservation Clearinghouse
- bulletin board service, WaterTalk
- and much more!

ACCESSING UWIN

There are several ways that you can access UWIN:

- 1) MODEM: Set your communications parameters to (8N1) or (7O1) and for best results, set your software to emulate a vt100, ANSI, or compatible terminal. Phone # 618-453-3324 or 618-4533090
- 2) TELNET: You can telnet to UWIN and look around but we do not recommend this as your regular access method as it limits your usage of UWIN's menu items. Use the command, telnet gopher.uwin.siu.edu. At the login prompt, log in as "guest" and use "uwin" as the password.
- 3) GOPHER (using gopher, xgopher, hgopher, etc.): Point your gopher client at gopher.siu.edu.
- 4) WORLD WIDE WEB (using Mosaic, Netscape, etc.): <http://www.uwin.siu.edu>

WATER TALK BBS

Many of UWIN's users have expressed a desire for a water resources bulletin board system so they could have the opportunity to communicate with others interested in issues related to water. WaterTalk was developed to meet this demand to talk water. WaterTalk is designed to provide a forum for communication about water resources related research, management, planning, and teaching. This bulletin board medium facilitates communication links between researchers, managers, consultants, administrators, teachers and graduate students. We hope the improved dissemination of information will help better the outcomes of our work to understand, manage, and sustain the environment's water resources.

ACCESSING WATER TALK

WaterTalk is a menu option on the UWIN main directory. Thus, accessing WaterTalk is easy once you have followed the above instructions for accessing UWIN.

1B) MODEM: At the login prompt, log on as "bbs" and use "uwin" as the password.

2B) TELNET: At the login prompt, log on as "bbs" and use uwin as the password.

3B) GOPHER: At the UWIN main menu directory, you choose the WaterTalk menu item to get to the Access WaterTalk option. At the login message prompt, log in as "bbs" and use "uwin" as the password.

4B) WWW: Choose the WaterTalk hyperlink on the UWIN home page.

Once you have connected to WaterTalk using one of the above methods, you can either log on as a guest (which will allow you to look around and read messages only) or you can type new to create a personal account on WaterTalk. Creating an account requires you to enter your name, phone, postal and e-mail addresses, and to create a personal password. If you are not accessing WaterTalk via the WWW, the system also asks for your terminal type (and if you are uncertain, it will offer a suggestion). Thereafter, you will use your name and password to log into the WaterTalk bbs after having gotten into the system by using "bbs" and "uwin", or selecting hyperlinks on the WWW.

WATER TALK BOARDS

WaterTalk is set up as a series of boards. The first board is called "Information" and contains the policies and procedures of the system as well as a listing of "Frequently Asked Questions" and their answers. Please read this information to acquaint yourself with the WaterTalk bbs environment. Each of the water resources related boards is centered around a particular topic. Presently, we have boards discussing hydrology, GIS, international water issues, education, groundwater quality, and water policy. Any user can suggest other topics for boards that they would like to see added. These boards are archived under the WaterTalk menu option on UWIN's main directory. Users can read and search through these previous posts for particular topics and discussions. With WaterTalk, you will have the capability to: read messages, post messages, e-mail other participants, on-line conferencing, and ftp documents. You can also forward posted messages back to your own e-mail address if you have one.

USING WATER TALK (WHEN ACCESSED VIA GOPHER, MODEM, OR TELNET)

WaterTalk follows a very simple command driven user interface and has a very handy HELP option. HELP is accessed by typing <H>. To get started, hit <ENTER> and select for the menu of boards available. Then you can choose <S> to select the board that you desire to engage. After you use WaterTalk, the system will keep track of what posts you have already read on each of the boards. When you log on, it will prompt you with "new" and you can hit <ENTER> to read any new posts since you last logged on. You can also set which subset of boards you wish to keep track using the <ZAP> command. When using WaterTalk, remember that the <HELP> command is always there to assist you. The main <HELP> directory explains the menu of options such as select, read, post, users, talk, mail, doors, zap, goodbye, etc. Each of these functions also has its own <HELP> directory. WaterTalk has many useful features that are too numerous to list here and these <HELP> directories can help you discover them.

USING WATER TALK (WHEN ACCESSED VIA WWW)

WaterTalk follows a very simple menu driven interface. To get started click on "Read Messages". Next, you will see a menu listing all the WaterTalk boards. Simply, click on the board name that you wish to read. After, choosing a board you will be presented with a listing of all the messages currently posted. To read a message, just click on its name. After reading the message use your browser's back feature to return to the list of messages. WaterTalk will keep track of the messages you have read, and selecting the "Read New Messages" option when you log in the future will show you only the messages you have not read.

More advanced features of WaterTalk can be found under the heading "Other Useful Commands". Two commands NOT found on the WWW version of WaterTalk are private email, and on-line chat (these will be coming soon). To use these features you need to access WaterTalk by telnet. Please Contribute to UWIN. We invite you to look around UWIN and WaterTalk and to send us your comments and suggestions. You can use the "COMMENT BOX" on the gopher main menu or the WWW home page. Or you can e-mail these to faye@uwin.siu.edu. We also invite you to submit information that you want to disseminate to the water resources community. If you have any ideas or information for posting on the system (such as conference announcements, job openings, water organization news, course syllabi etc.), please send to:

Faye Anderson
UWIN c/o UCOWR
4543 Faner Hall
Southern Illinois University
Carbondale, IL 62901-4526
Fax: 618/453-2671
e-mail: faye@uwin.siu.edu

CONFERENCES

3rd International Slow Sand/Advanced Biological Filtration Conference

April 22-24, 1996

**Imperial College of Science
Technology and Medicine
London, United Kingdom**

Possible conference subject areas include: comparisons between slow-rate and fast-rate biofiltration; process application and modifications; removal mechanism/modelling; pretreatment applications; and research needs. The objective of this conference is to provide a physical, chemical and biological perspective on factors affecting the performance of biological filtration processes, from slow sand filtration to more advanced biological treatment techniques such as biological activated carbon (BAC). For conference info and abstract requirements (deadline 7/1/95) contact: M.R. Collins, UNH Dept. of Civil Engineering, Env. Research Group, Durham, NH 03824, 603/862-1407 or fax 603/862-2364 or email: robin.collins@unh.edu

North American Water and Environment Congress '96

**June 22-28, 1996
Anaheim, California**

The conference will provide a forum for discussion and exchange of information on a broad spectrum of areas in water engineering, quality, resources, planning, and management. Furthermore, the conference will consider international issues relating to the North American Free Trade Agreement (NAFTA). This conference will be hosted by the following division of the American Society of Civil Engineers: Environmental Engineering, Water Resources Engineering, Water Resources Planning and Management, and Waterway, Port, Coastal and Ocean. For more info on abstract submission (deadline 8/25/95) contact: Udai P. Singh, Technical Program Chair, North American Wtr. & Env. Congress'96, CH2M Hill, 1111 Broadway, Suite 1200, Oakland, California 94607, 510/251-2888 or fax 510/893-8205.

IAWQ: Water Quality International '96

**June 23-28, 1996
Singapore**

IAWQ is the International Association on Water Quality. Its mission is to promote internationally the professional advancement of the science and practice of water pollution control. The main interests are wastewater treatment processes of all kinds; sources and impacts of all types of pollutants on receiving waters; hazardous waste management and source control; environmental restoration. For conference, manuscript, or poster session information, contact: IAWQ, 1 Queen Anne's Gate, London, SW1H 9BT, England, Tel: 44-171-222-3848 or Fax: 44-171-233-1197.

Other Conferences...

May 30-June 1, 1995 Keystone, Colorado, North American Benthological Society, 43rd Annual Meeting - CONTACT: Cathy M. Tate, USGS, WRD, Box 25046, MS 415, Denver Fed, Ctr., Denver, CO 80225, 303/236-4882

June 20-23, 1995 Fredericton, New Brunswick, 48th Canadian Water Resources Association's Conference - CONTACT: Dr. Nabil Elhadi, Environmental Planning & Sciences Branch, NB Environment, P.O. Box 6000, Fredericton, NB E3B 5H1 (506/457-4844).


June 25-28, 1995 Honolulu, Hawaii, AWRA Annual Summer Symposium (An International Symposium) "Water Resources & Environmental Hazards: Emphasis on Hydrologic and Cultural Insight in The Pacific Rim." - CONTACT: AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, MD 20814-2192 (301/493-8600 or fax 301/493-5844).

July 16-19, 1995 Fayetteville, Arkansas, Animal Waste & The Land-Water Interface - CONTACT: Arkansas Water Resources Ctr., Univ. of Arkansas, 113 Ozark Hall, Fayetteville, AR 72701, 501/575-4403, or fax: 501/575-3846.

August 14-18, 1995 Brno & Prague, Czech Republic, Second IAWQ Specialized Conference on Diffuse Pollution - CONTACT: Vladimir Novotny, Dept. of Civil & Environmental Engineering, Marquette University, Milwaukee, WI 53233.

September 18-20, 1995 Tampa, Florida, Versatility of Wetlands in the Agricultural Landscape - CONTACT: ASAE, 2950 Niles Rd., St. Joseph, MI 49085-9659.

November 5-9, 1995 Houston, Texas, AWRA 31st Annual Conference & Symposia "Water Management in Urban Areas, "Advances in Model Use and Development in Water Resources," & "North American Water Resources." - CONTACT: AWRA, 5410 Grosvenor Lane, Suite 220, Bethesda, MD 20814-2192 (301/493-8600 or fax 301/493-5844).

July, 1996 Syracuse, New York, AWRA Annual Summer Symposium "Watershed Restoration Mgmt.: Physical, Chemical, & Biological Considerations." - CONTACT: AWRA, 950 Herndon Pkwy., Suite 300, Herndon, VA 22070-5528, 703/904-1225, or Fax: 703/904-1228. 

AAEE/AEEP ENVIRONMENTAL ENGINEERING EDUCATION AND PRACTICE CONFERENCE AUGUST 3 - 6, 1996 UNIVERSITY OF MAINE

Planning for the 1996 Conference has begun with the formation of a sixteen member organizing committee. Please take a few minutes to think about what you want to happen at your conference. You are encouraged to contact committee members (listed below) with ideas and suggestions for session topics, workshops, speakers, and other activities.

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US EPA Research Grants

DEADLINE: APRIL 17TH

As part of its commitment to improving scientific research, the U.S. EPA recently announced a competition for \$8 million in new research grants for U.S. universities and other not-for-profit research institutions. The grants will fund research in the areas of human health assessment, indoor air quality in large office buildings, air pollutants, and vulnerability of regional water resources to global climate change.

Applications must be received by EPA's Office of Research and Development by April 17, 1995.

The request for applications (RFA) is the first of three solicitations to be issued under an expanded grants program to support high-quality research by outside scientists in areas important to EPA's research needs. The new program will double the Agency's existing research grants program in fiscal year 1995 with the addition of \$22 million.

Subsequent RFA's will invite applications for grants to be awarded jointly by EPA and the National Science Foundation (NSF) for research in areas of mutual interest such as water and watersheds and technology for a sustainable environment, and for grants related to EPA's Environmental Technology Initiative.

For more information about this initiative, call the EPA Office of Exploratory Research at 202-260-7474. Information can also be accessed via Internet:

World Wide Web address [HTTP://WWW.EPA.GOV](http://WWW.EPA.GOV)

Gopher address GOPHER.EPA.GOVR-22

UNIVERSITY RESEARCH FUNDING SITUATION IN EPA: *THINGS LOOK GOOD BUT BEWARE OF BUDGET CUTS*

by C. Robert Baillod
AEEP Legislative Affairs Committee

Over the past several years, AEEP has worked with the EPA Office of Research and Development (ORD) to increase funding for environmental engineering research, particularly in the area of exploratory research funding for universities. These efforts have recently met with success as the Office of

Exploratory Research (OER) funding for extramural competitive grants has gone from \$22 MM in FY94 to \$44 MM in FY95 and is scheduled to go to about \$84 MM in FY 96, eventually reaching \$100 MM. In addition, ORD is establishing a large graduate fellowship program in FY95. Funds have been set aside to fund 100 fellowships in 1995, 200 in 1996, and 300 in 1997 at about \$17 K/year apiece.

The increased funding for the OER Grants and Fellowship program is not really new money but has been pulled from other areas of EPA, particularly from contract research. In addition, the EPA research labs are being reorganized into what might be described as five "Mega-Labs and/or Centers": 1) Health and Environmental Effects; 2) Exposure Research; 3) Risk Management Research; 4) Environmental Risk Assessment Center, and 5) A Washington, D.C. based center housing the Office of Exploratory Research, the new Graduate Fellowship Program, and Peer Review.

Another new feature of interest to university researchers is a joint solicitation by EPA and NSF. Approximately \$14 million of the \$22 million of new exploratory research grants will be awarded under the joint EPA/NSF solicitation focusing on technology for sustainable development, environmental evaluation and policy, and watershed systems. The remaining \$8 million of new grants will be awarded by EPA in a separate solicitation targeting areas of interest to the agency. (For additional details see Environmental Science and Technology, 29(3):126-129, March 1995.)

From the AEEP viewpoint, things look good.

However, with the new congressional power structure, these planned increases are extremely vulnerable. Because the OER budget lines are slated for such large percentage increases, they are very visible to those looking to make budget cuts. It is possible that much of the increase contained in the FY1995 budget may be rescinded and that the increases slated for 1996 could be eliminated altogether. It is important that AEEP members and their universities express support for the current and planned increases in funding for EPA's Office of Exploratory Research. We should make the argument that federal funding has been starving exploratory research in science and environmental engineering while it has been pre-occupied with funding technology and techno-gadgetry. The funding required for the OER programs is small compared to the large technology demonstration programs, and this exploratory research in science and environmental engineering can pay large dividends. ☐

WHAT BUSINESS WANTS -THE NIE

Richard J. Mahoney, chair and chief executive office of Monsanto Company, recently explained why business believes the NIE could improve decision-making on environmental issues.

"Sound science is an ingredient that's occasionally in short supply as our nation tries to cope with difficult and costly environmental issues. It's needed for setting priorities and allocating resources among the many problems

awaiting solutions," Mahoney noted. The NIE's governing board, which will include representatives from business, environmental groups, academia, state and local governments, and community organizations, will help meet this need by identifying environmental research needs prior to funding extramural research.

The NIE's credible, peer-reviewed information, as well as its independence, are key considerations for Mahoney and many other business people: "I'm especially impressed with your efforts to ensure that the

Institute will deliver high-quality work - with adequate funding - and can remain independent of others' agendas," said Mahoney.

From the beginning, business has expressed a strong desire to remain involved in developing the NIE. The support of companies like Monsanto, Pacific Gas and Electric, and others, is vital to shaping a viable Institute.

AWRA Announces Its Schedule of 1995 Meetings

The American Water Resources Association will be conducting the following meetings this year. For detailed program and registration information, please contact Kerry L. Curtis, Manager of Customer Services, AWRA, 950 Herndon Parkway, Suite 300, Herndon, VA 22070-5528 or fax 703/904-1228.

April 23-26, 1995

1995 Annual Spring Symposium

"Water in the 21st Century: Conservation, Demand, and Supply"

Read Lion Hotel Salt Lake City
Salt Lake City, Utah

June 25-28, 1995

1995 Annual Summer Symposium

"Water Resources and Environmental Hazards: Emphasis on Hydrologic and Cultural Insight in the Pacific Rim"

Hilton Hawaiian Village Resort
Honolulu, Hawaii

September 18-20, 1995

National Conference Jointly sponsored by AWRA and ASAE
"Versatility of Wetlands in the Agricultural Landscape"

Hyatt Regency Tampa
Tampa, Florida

November 5-9, 1995

1995 31st Annual Conference and Symposia

"Water Management in Urban Areas"

"Advances in Development and Use of Models in Water Resources"

"North American Water Resources"

Wyndham Greenspoint Hotel
Houston, Texas

The American Water Resources Association is a non-profit association, founded in 1964, whose mission is to provide an interdisciplinary forum for promoting education, cooperation among organizations, and information exchange to support effective water resources management.

United Nations Industrial Development Organization

The United Nations Industrial Development Organization (UNIDO), Industrial Sectors and Environment Division (ISED) welcomes unsolicited proposals in the areas of industrial development and environmental protection, specifically as follows:

1. Human resource development
2. Development and transfer of technology

3. Industrial rehabilitation and modernization
4. Small and medium-scale industries
5. Environment, energy, and sustainable industrial development
6. Industrial investment promotion
7. Integration for women in industrial development


UNIDO is constitutionally mandated to promote and accelerate the autonomous industrial development efforts in its Member States as part of their social and economic development. Demand orientation is a precondition for the implementation and effectiveness of UNIDO services. In general the UN Member States place their demands in terms of unsolicited proposals for review and possible acceptance by UNIDO. While the under-developed and developing countries may have demands to be assisted, the well developed and developing countries may have the demands to assist the others. UNIDO has been matching the "demands" and the "supplies" around the world since 1967 with great success. Finding various sources of funds to finance the matched projects is part of UNIDO's responsibilities. Those who are interested in submitting unsolicited proposals shall contact: Dr. Lawrence K. Wang, UNIDO/ISED, Vienna International Center, P.O. Box 300, A-1400 Vienna, Austria, Fax No. 43-1-232156.

The NIE at a Glance...

The NIE (National Institute for the Environment) will:

- Assess existing environmental knowledge and identify issues of critical importance where scientific information is needed.
- Fund peer-reviewed research on environmental resources, systems, and sustainability in any science, social science, or engineering field required to understand an environmental problem.
- Communicate environmental information to the public and decision makers at all levels through a universally accessible electronic network, the National Library for the Environment.
- Support higher education and training to prepare future generations of environmental professionals, and sponsor outreach to raise public environmental literacy.

NIE's inclusive Governing Board, balanced by scientists, environmentalists, business, state and local government, and environmental justice and community groups, will set NIE's priorities for environmental research and ensure that the NIE addresses the needs of all decision-makers. The NIE will complement, not replace, existing research programs. An Interagency Advisory Council will help coordinate, and prevent duplication with existing federal programs.

The Committee for the NIE is a national non-profit group of more than 8,000 scientists, environmentalists, business leaders, and other concerned citizens. For more information, contact: CNIE, 730 11th Street, NW, Washington, DC 20001, tel: 202/628-4303, fax: 202/628-4311, or email: cnie@access.digex.net 

“Civil Engineering: Looking for a Global and Environmental Ethic”

J. Charles Jennett
Provost and VP for Academic Affairs

Clemson University
*Presented at ASCE Convention
Atlanta, GA*

October 11, 1994

My thanks to Sam Clemence for inviting me to be here, to those of you who have shown up at this early hour and to the American Society of Civil Engineers. I have always heard that civil engineers were different and in many ways that's true.

So let's start off this morning with the assumption that we are, in fact, different. As civil and environmental engineers we are searching for a global and environmental ethic that will allow us to have our cake and eat it too. We believe we can continue to raise our families and prosper and have everyone else in the world join in this prosperity. At the same time, we strive to protect, not destroy, the environment that made this world such a beautiful place.

As late as the 1970's, environmental engineers were called sanitary engineers. Their primary interest was in producing high quality water, clean waste water, clean air, clean soil, and disposal of solid waste in a manner that would prevent disease. The primary emphasis of the profession was on health concerns. Starting in the 1980's, much more emphasis was placed on environmental concerns in the grandest sense: the impact of the works that we did on the terrestrial ecology, aquatic systems and the air. Today we live in a global society, so close in many ways that every decision we make affects other parts of the world. Decisions we make must be made on an ethical basis because they not only affect us but everyone else in the world.

Ethics are difficult to talk about, partly because most people confuse them with morals. Besides, they bring up a lot of uncomfortable questions that most people do not even want to talk about. Ethics for engineers are usually contractual issues, and are nowhere near as complex as questions of the environment, race, religion, sex, water rights, life and death - all of which are often interrelated.

Ethical questions, according to my good friend Aarne Vesilind in his book, "*Environmental Ethics for Engineers*," are questions about how we ought to act. "We do not speculate, discuss, and disagree about ethics merely for the fun of it but because we wish to know how we should live and particularly how we should treat others." "In other words, what are the limits of the moral community, a class of beings which we ought to consider as having worth and towards which we are obligated to act or forebear in various ways."

Webster's Collegiate Dictionary says that morals are: "...of or relating to principles of right or wrong in behavior..." An ethic is defined as "...the discipline dealing with what is good and bad and with moral duty and obligations, or a set of moral principles or values..." Confused? Well, so am I. I grew up in family with two priests and two Baptist ministers, and I assure you, the debates on just those two words alone could go on endlessly. But for right now, let's assume that we want to do what is "right" for the world but that the work "right" may come from totally different sets of values. And then let's go on with the discussion. Because what I would like to do this morning is to start a dialog with you in which we all understand when we finish that we will not decide today what is right or wrong, but that we must, as engineers, start talking about what is right and wrong in the world today with the types of projects we envision building. We can no longer deal with those issues without at least considering the global impact.

Whatever we are as engineers, and particularly civil engineers, we are the people who are changing the world. We do it for money (according to the economists) or more likely, we do it for what David Billington described in his book as "fun" and is similar to the creative arts in providing fulfillment. I agree with fun, but regardless of the reasons why we do it, we must acknowledge that our projects change the world.

I promised Sam Clemence over a year ago that I would give a speech. However, when one agrees to give a speech a year in advance, one never expects that the time will come when one actually has to deliver. During this past year, I've collected information concerning my topic. To my surprise, I have found that much of what I was going to say has already been said. The first thing I was going to do was tell you about the most dangerous chemicals in the world and see how you felt about them. What do you think the great environmental threats are today? Radiation? Nuclear waste disposal? Solid waste? Air pollution? PCBs? Radon? Alar? Food additives? According to an extremely well researched book by Gregg Easterbrook entitled, "*A Moment on the Earth*" that is coming out next year, but was reported in the New York Times on September 11 of this year, the world's greatest environmental dangers are dung smoke and dirty water.

Surprised? You shouldn't be. It's odd that the engineers who change the world probably more than any other group know less about the history of the world that they are changing. In 1900 there would have been no doubt about the dangers. Everyone would have known that the greatest threat was dirty water. Chlorination took care of it in this country, Western Europe, Japan and some of our neighbors to the north and south, but I assure you that cholera epidemics are still major factors all over the rest of the world. To worry about a 1 in 4 billion chance of cancer from PCBs compared to a 1 in 3 chance of cholera make the rest of the world wonder about the United States - it's ethics and morals.

Dung smoke, you say? How can that compare with dioxins? Well, the truth of the matter is that four million children die annually from respiratory distress where people live in poorly ventilated huts in which fuels such as wood, cow dung, and other solid wastes are used for heating and cooking. I didn't say that: the United Nations said that. Air pollution is worse in Calcutta, Lagos and Mexico City than in any western metropolis, including Los Angeles. Last year, according to the World Health Organization, **four million** third world children died from acute respiratory disease.

How bad can the water be? The answer is unimaginably bad. Most of Africa, the Indian sub-continent and Latin America have no waste water treatment facilities. Raw human and industrial sewage is discharged in the same bodies of water used for drinking. Mothers draw for their children water of lower quality than the process affluent discharge from American factories, according to Gregg Easterbrook in his New York Times article. For example, China alone sent 25 billion tons of unfiltered industrial pollutants directly into the waterways in 1991, which means that one country sent more toxic water pollution downstream than the entire western world. Most of the people of the world drink, cook and bath in water that is the equivalent of raw sewage.

What if all the world had 98% treatment of water and waste water and suddenly and magically were able to live at the standards of America? This would mean that energy consumption in the world would overnight go up more than a hundred-fold. Let's assume for a moment that that's pollution-free energy somehow. In 24 years, at the present rate of growth, the population of the world will double, we would now be at 49%, and in another 24 years it will have doubled again and we would be at 24.5%. How do you feel about mandatory birth control? How do you feel about abortion? How do you feel about having cleaned up an environment only to have the next generation mathematically conclude it beyond their control? These are interrelated questions and are issues being faced by the United Nations and countries throughout the world now.

National issues to be addressed include: should swamps like the Okefenokee and the tip of Florida be drained to allow more people to live there; should people be located in areas where no one wants to live because it is more convenient; and should water be piped from the Rio Grande out of its basin so that the deserts will bloom in Colorado to the detriment of New Mexico, Texas and Mexico? Should we subsidize desert farming? How about desert lawns?

There is an assumption in our country that because "water is life," we should make the deserts bloom and use the money of others to do it. By making our deserts bloom and producing large amounts of food, we enrich our own country. However, the agricultural industries of the other countries where this cheaper food is sold are hurt. If we make a desert bloom, do we have a right to perform such an unnatural act? Do we have a right to cut forest to make furniture, thereby destroying the land resources of other countries and putting them in permanent penury?

Do we have the right to insist that all countries have our environmental laws? If the answer is yes, how do we enforce it? **If the answer is no, should we do more than they do? Either way, to some degree we perpetuate the problem of keeping us rich and them poor.**

Fortune Magazine, in the September 19, 1994, issue ran an article, "Environmentalists Are On the Run." It stated that the United States is spending what amount to 2.2% of its GDP on environmental issues versus 1.6% to 1.8% for Germany and 1% to 1.5% for Japan. This has allowed them to protect us from PCBs, asbestos and Alar without ever describing the fact that Alar's risk is less than that of having a well done hamburger or peanut butter sandwich. We will spend billions on removing asbestos from schools even though it is four hundred times safer to have a young person around it than playing football or that cigarette smoking is fifty thousand times more dangerous (and that particular one we actually subsidize). Interestingly enough, there was a definition by Mr. Delaney (who submitted a bill) of zero risks. In 1958, this meant a risk of no more than one in a million, but today it is one in a trillion or a million times less than it was when originally conceived.

Assuming that you agree with this, do you feel these standards that we think are ethically proper should be imposed on a world with far more critical problems. Is there a better way? This is a typical engineering problem. You have a source of numerous imperfect alternatives with which to find a solution, which itself will not be perfect, but hopefully will be elegant in its choices.

Let's get back to the babies. The statement is often made that one shouldn't have any more children than one can afford. The implication of this is that rich people should have more babies than poor people. How would you like to sell that to a starving world? The truth of the matter may be that the richer your country, the fewer children you should have because you use more natural resources.

When I started thinking about this paper it occurred to me that in the last analysis engineers, and particularly civil engineers, are optimists. They feel as if they can change the world in ways that allow them to have their cake and eat it too; or if you please, have life and have it more abundantly. There are people though who say, "you can't change the world." You have to live on some basic and primitive nature that we should have all the babies we want (or can afford) and that we should live our lives in ways that are meaningful to nature. This is very often defined as some sort of greater, more glorious world without technology.

Before you say that this is not me, you have to determine how you feel about dams, nuclear power or sources of energy that might supply the developing countries with large amounts of energy resources, fertilizers, and such things that would allow them to develop and have the resources they need.

These are not new problems. In the early 1800's, a man by the name of Cartright developed a mill that allowed handfuls of people to do weaving that previously took thousands to do. There was almost an immediate revolution. The followers of Ned Ludd started tearing up machines, and we now have the word "luddite" in our dictionary. One definition of this is "any opponent of new technologies and new technological change." The question is: are environmentalists the new luddites?

We must start a discussion on global environmental ethics realizing different people rightly have different views of beauty, right and wrong, God and the future. We can only solve these issues with rational discussion. Limiting growth limits options for us and for a world that has not had options. Let's start the discussion now. Questions?

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