
BULLETIN

Spring 2006

"American Institute of Hydrology, the Society for Registered/Certified Hydrologists"

Volume 24, Issue 1

AIH Unveils a Hydrologic Technician Program

The Executive Committee of AIH has been working with a group of senior hydrologic technicians and hydrologists from various agencies to develop a program for hydrologic technician (HT) certification. Our goal is to have HT certification offered at 3 levels through our Institute by the end of 2007.

Why should AIH be concerned about hydrologic technician certification? The science of hydrology relies on good data to obtain valid conclusions. For a great part of data used by hydrologists, someone other than a hydrologist has collected the information in the field. Certification of technicians is a natural extension to professional certification and to the support of hydrology as a meaningful science. Public agencies and industry are concerned about the way data are collected with respect to standards and usability. (Can we identify numbers?) They desire some way to define the competence of those employees that collect to data used in water-resource decision making.

AIH has formed a committee to develop a hydrologic technician certification process. It consists of AIH members, USGS technicians, and members from a water agency and a consultant firm. The committee has determined that as a start, there will be three categories of technician for surface-water, ground-water, and water-quality, similar to the professional categories. It has determined that there will be three levels for each category: 1. trainee, 2. journeyman, 3. senior. The testing will include concepts, skills, and safety commensurate with each level and category. There will be only the one test given for all categories at level 1, the trainee level. The committee has decided that it is important for all trainees to have a basic knowledge of the three components of hydrology. This overlap will not occur in the remaining two levels. Separate tests will be given for surface water, ground water, and water quality. The candidate for level 1 (trainee) will be required to have a minimum 1 year practical experience under the supervision of a professional hydrologist or senior level hydrologic technician or an

Associate or Bachelor of Science degree with a minimum of 12 hours of water-related coursework. A journeyman level (2) will be required to have 5-years experience, and a senior level will be required to have 12-years experience. A journeyman will be required to have passed the trainee exam, and a senior will be required to have passed both the trainee and journeyman examinations. Applicants will be able to be certified in one or more categories.

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Toxic Pit Bit of a Money Mine

BUTTE, Montana - Turning Lemon into tourist lemonade, the Chamber of Commerce in this mining city is charging admission to see one of America's largest bodies of toxic water. And people are paying.

The chamber launched a trial run last summer, charging visitors \$1 to gaze at the Berkeley Pit and its placid, gray water. There were enough people willing to pay that officials decided to charge again this year - doubling the price to \$2. Admission fees brought in about \$18,000 between June 15 and September 30 last year. Some of the proceeds will go toward improvements intended to make the site even more attractive to tourists.

The Berkeley Pit is a former copper mine that began filling in 1982 with drainage from closed mines. It now holds about 36 billion gallons of water laden with arsenic, copper, cadmium, cobalt, iron and zinc. The tainted water cover about 500 acres, at a depth of some 900 feet and is toxic enough that it was blamed for the deaths of 342 migratory snow geese that landed on the water in 1996. Now visitors sometimes hear noisemakers intended to scare the birds away.

The pit is on the federal Superfund cleanup list. It is also on the Website of Travel Montana, the state tourism office. - THE ASSOCIATED PRESS

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Advertisement Rates are as follows:

SPACE	RATE	SIZE
1 page	\$595	9½ x 7½"
1/2 page	\$349	9½ x 3½" (1 column)
1/2 page	\$349	4½ x 7½" (1 banner)
1/4 page	\$199	4½ x 3½" (1/2 column)
1/8 page	\$125	2¼ x 3½" (1/4 column)

Advertisers agreeing to publish an ad in three consecutive issues will receive FREE publication in the fourth issue.

Emails for the Executive Committee

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PRESIDENT'S MESSAGE

I trust that all of our members are having a good and productive Spring. At AIH, we are working with Vijay Singh, Jun Xu, and other members of the organizing committee in finalizing the final program for our 25th Anniversary Meeting, highlighted by an international conference.

On May 21, and in connection with our Meeting, we are offering the following short/training courses on the LSU Campus: Hydrologic Field Methods - Ground Water; Hydrologic Field Methods - Surface Water Hydrology and Water Quality; AIH Fundamentals Review Class; AIH Principles and Practices - Surface Water Review Class; and AIH Principles and Practices - Ground Water Review Class. In the evening we are having an Icebreaker Reception at the Holiday Inn Select & Executive Center in Baton Rouge, the site of our Meeting and international conference.

The Opening Plenary Session of the conference is on Monday, May 22, and includes welcoming remarks by several officials such as the LSU Chancellor, Louisiana Governor, and others. There will be also a presentation by author John Barry on the Mississippi river and coastal Louisiana.

The conference's excellent technical program includes oral and poster sessions on coastal Louisiana, coastal hydrology and processes, coastal surface water and ground water interactions, coastal wetlands and restoration, coastal sedimentation, coastal watershed studies, coastal water quality - saltwater intrusion, hurricane Katrina impacts, flood control and risk assessment, hydrologic modeling - watersheds, coastal water quality - best management practices, GIS and spatial applications, land use and climate change impact, coastal water quality - sediment and contamination, Katrina/Rita panel discussion, upper Mississippi river basin, coastal ground water and modeling, extreme weather impacts, coastal water quality and modeling, and surface hydrology and modeling.

In addition to the aforementioned sessions, we are having an AIH 25th Anniversary Symposium addressing topics such as: reaching a broader base, employer and societal needs, and analysis and recommendations. Also, there will be keynote speeches related to ecosystem health and water quality, coastal ecosystem rehabilitation, and so forth. We have also scheduled two luncheons and a banquet. Finally, we have organized field tours on Katrina impacts and levee systems in New Orleans and the Mississippi river diversion and Atchafalaya river basin.

I look forward to seeing all AIH members at our 25th Anniversary Meeting in Baton Rouge.

Miguel Marino
AIH President

Conceptual Model of Water and Dissolved Salts Movement Through Portland Cement Concrete

Gary L. Guymon, Professor Emeritus
University of California, Irvine.

Theodore V. Hromadka, Professor
United States Military Academy, West Point, New York
& Professor Emeritus, California State University, Fullerton

THE PROBLEM

A frequently occurring topic in hydrology is the movement of soil moisture through concrete slabs and into the interior of the structure. The problem is the potential (or lack of) movement of water through Portland cement (PC) concrete slabs that may range in thickness from 3 to 5 inches. Frequently, the source of water generally is underlying groundwater that is naturally occurring, or may be provided by man as irrigation seepage or other factors. These waters have dissolved salts, particularly the sulfate ion, which is occasionally observed on floor surfaces or has damaged floor coverings such as carpet and caused tiles to loosen. When there is moisture transport, the underlying mechanism may be described by the theory of unsaturated flow in porous media.

PC CONCRETE

PC concrete is a man-made stone consisting of aggregate, Portland cement (a limestone powder), and water to initiate the chemical reaction to cause the cement to harden and bind the aggregate together into a solid matrix. Aggregate is usually sand to gravel sizes. Various admixtures are sometimes added to the wet mix to promote desired properties such as early curing or enhanced workability.

Generally, PC concrete will reach about 95 percent of its maximum strength within about 5 days. Concrete is strongest in compression and its compressive strength as well as tensile strength is enhanced by steel reinforcement.

The construction process for installing PC concrete as building slabs and foundations is to truck in ready mixed concrete to the site and pour or pump the concrete into forms to form a pad or slab on compacted soil which may have a thin gravel layer between the slab and soil. Prior to this, plastic sheeting is often laid down to form a barrier to upward water movement after the concrete is cured. Additionally, wire reinforcing screen is often laid down on approximately one inch thick blocks to keep the screen elevated in the mixture. In modern practice, it is common to vibrate the wet concrete to minimize voids.

Sometimes workers can be seen punching holes in the plastic sheeting before the ready mix arrives. This is done for two reasons. One is to allow excess water in the ready mix to drain faster and promote faster setup and curing. The other is that excess water causes what is called "crazy cracks" to form during working and curing, making exposed surfaces somewhat unattractive.

PC CONCRETE AS A POROUS MEDIA

In nature, when a cementing agent, aggregate, water, and time are suitable, an indurated sedimentary stone is formed. Fine uniform silts are called "siltstone" while uniform sands are called "sandstone." When a mixture of sizes ranging to gravel or larger sizes are present the stone is called "conglomerate." PC concrete is basically a man-made conglomerate.

Almost all of these stones are a porous media with a finite porosity and hydraulic conductivity. For example, Domenico and Schwartz (1990) indicate that ranges of values for saturated hydraulic conductivity for siltstones, sandstones, and limestone may be from 10^{-11} to 10^{-9} m/s.

During its curing phase, PC concrete has small pores that are caused by entrapped air and water. If the workmen are not careful, some pores can be quite large (cm sized). Some of the pores are interconnected so that the hardened porous concrete has a hydraulic conductivity which may be in the range of those listed for sandstone.

Porous PC concrete will allow unsaturated as well as saturated flow to develop in the presence of a water source. The presence of cracks perpendicular to a water source will inhibit unsaturated flow, and cracks of any orientation will enhance saturated flow.

THE HORIZONTAL PC CONCRETE SLAB

The potential movement of moisture and transport of dissolved minerals through a horizontal PC concrete slab is envisioned as a predominantly one-dimensional process. It is recognized that at the edges of the slab where the building wall footings are, there is potentially a two-dimensional flow and transport process.

Continued on Page 6

Journal of Hydrological Science and Technology 2006 Call for Papers

The Journal for Hydrological Science and Technology is the peer reviewed technical publication of research and practical studies on Hydrologic and related topics. The Journal was initiated by the founders of AIH in 1985 to publish regular and brief technical papers that communicate ideas, findings, methods, techniques or summaries of interesting projects or investigations. The Journal accepts papers dealing with all aspects of Hydrology and Water Resources, including water pollution and hazardous waste issues. The Executive Committee recently appointed Dr. Ted Hromadka as the Editor of the Journal and B.J. Seaburn will continue as the AIH's Publication Manager. Contact BJ if you want to submit a paper or if you would like to serve as a reviewer at bjesterstudio@aol.com. Please indicate the type of papers you would like to review. If you know of others that may have a paper that can be published, please forward this information to them or invite them to visit our web site at www.aihydro.org.

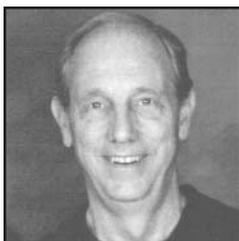
The submission deadline for accepted papers in Volume 22 is **September 15, 2006**. The 2006 Journal Volume 22 will be printed and distributed by **November 30, 2006**.

**Should you have a paper for consideration,
please submit a 250 word abstract of your paper to:**

**American Institute of Hydrology
300 Village Green Circle, Suite 201
Smyrna, GA 30080.**

Nominations for AIH Officers

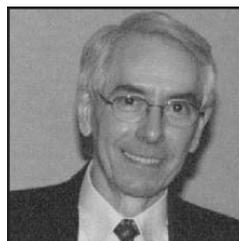
AIH Bylaws stipulate that the President Elect automatically becomes the new President. The President becomes the Past President. The term of elected office is two years. Only the General Secretary and the Treasurer are allowed to succeed themselves in elected office.



President

Mr. Antonius Laenen

Consulting Hydrologist (Ret. USGS)
Portland, Oregon

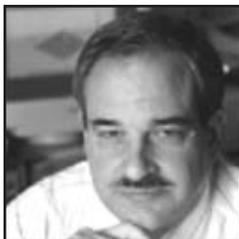


Past President

Dr. Miguel Marino

University of California
Davis, California

The Nominees for elected office in AIH during the administrative term beginning January 1, 2007 and ending on December 31, 2008 are:



Candidate for President-Elect

Dr. Miguel A. Medina, Jr.

Pratt School of Engineering
Duke University
Durham, North Carolina

Biographical Note:

Miguel Medina is Professor of Civil and Environmental Engineering, Duke

University, and has been a registered Professional Hydrologist since 1983, as well as the AIH Vice-President for Institute Development from 1998 to 2000. Most recently he served as the Chairman of the 2006 R.K. Linsley Award Committee. Professor Medina has conducted funded research in hydrologic and water quality mathematical modeling for the U.S. Environmental Protection Agency, the National Science Foundation, the Office of Water Research and Technology, the U.S. Air Force, the U.S. Army Waterways Experiment Station, the Naval Oceanographic Office, DuPont Engineering, the U.S. Geological Survey, the North Carolina Water Resources Research Institute, and the State of North Carolina. His current research focuses on flow and solute transport surface/ground water interactions. The results of his research are reported in such journals as *Advances in Water Resources*, *Ground Water*, *Water Resources Research*, *Journal of Contaminant Hydrology*, *Journal of Hydrology*, *Applied Mathematics and Computation*, *Journal of the American Water Resources Association*, *Computing in Civil Engineering*, *Journal of Water Resources Planning and Management*, *Journal of Environmental Engineering*, *Hydrological Science and Technology*, and *Environmental Health Perspectives*. He was named External Evaluator of the UNESCO International Hydrological Programme from 2002 to 2004. Miguel Medina is also a former President of the Universities Council on Water Resources, Inc. and the North Carolina Section of the American Water Resources Association, and former Director of the Center for Hydrologic Sciences at Duke University.

Goals:

Miguel believes that AIH, with its unique membership blend, can:

1. assume a greater leadership role towards promoting a better understanding of the complex interactions across phases of the hydrologic cycle; and
2. in parallel, more aggressively seek to increase the registration of professionals with very sound technical backgrounds, both nationally and internationally. A strategy to accomplish these goals needs to be developed, and this effort will require the enthusiastic participation of our membership, which includes many distinguished individuals from academia, government and private practice.



Candidate for Vice President for Academic Affairs

Dr. Stephan J. Nix

University of North Florida
Jacksonville, Florida

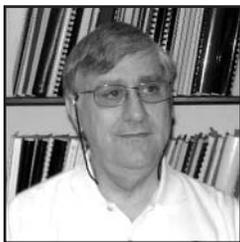
Biographical Note:

Dr. Nix was born in Forest, Mississippi, and grew up in Homestead, Florida. He received the Bachelor of Science in Engineering Sciences (1974), Master of Engineering in Environmental Engineering Sciences (1976), and Doctor of Philosophy in Environmental Engineering Sciences (1982) from the University of Florida. Dr. Nix served on the faculty of Syracuse University from 1983 to 1994 and the faculty of the University of Alabama from 1994 to 1997. In 1997 he was appointed Professor and Chair of Civil and Environmental Engineering at Northern Arizona University, where he remained until 2001. From 2001 to 2004 Dr. Nix served as Professor and Founding Chair of Civil Engineering at Florida Atlantic University. In August 2004 he was appointed Professor and Director of the Division - of Engineering at the University of North Florida. Dr. Nix is the author of over 80 publications on urban water resources, environmental systems, and computer modeling. He has been a consultant to several municipalities on wet weather flow management. He has also conducted research for a number of agencies including the American Water Works Association Research Foundation, Niagara Mohawk Power Corporation, Alabama Power Company, the US Environmental Protection Agency, the Arizona Department of Environmental Quality, and the National Science Foundation. Dr. Nix is an active member of several organizations including the American Society of Civil Engineers (held several offices in the Syracuse Section), the American Water Resources Association (served as national President in 1997), the Water Environment Federation, the American Institute of Hydrology, the Florida Engineering Society, and Sigma Xi.

Goals:

1. improve the efficiency of the certification process while maintaining high standards,
2. prepare a review packet for the AIH certification examinations, and
3. develop a program of direct communications with hydrology professors and programs at universities to promote the H-I-T path to certification.

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**Candidate for
Vice President for Institute Development**
T. Allen J. Gookin, P.E., L.S., P.H.
Gookin Engineers, Ltd.
Scottsdale, Arizona

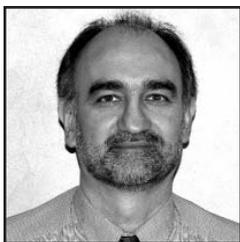
Biographical Note:

Mr. Gookin is a graduate engineer from Arizona State University with Distinction. He has worked as Chief Financial Officer for

Gookin Engineers, Ltd. for his professional life, specializing in providing expert witness services in issues concerning water rights, flood control, and groundwater-surface water interactions. He is an acknowledged expert in the Arizona legal concept of subflow and is the developer and co-author of the Court-approved "Call System" computer program utilized to operate the Gila River in Arizona. Mr. Gookin is a registered civil engineer in Arizona, California, and Nevada. He is also a registered land surveyor in Arizona.

Goals:

I came into the American Institute of Hydrologists by recruitment from another member. I believe that development can occur primarily by member recruitment and will recommend the development of an incentive system to encourage membership recruitment. My specific goal will be to create a rank of fellow for those who have provided valuable assistance to the American Institute of Hydrologists through recruitment and/or service to the Institute.



**Candidate for
Vice President for International Affairs**
Dr. Neven Kresic
Malcolm Pirnie, Inc.
Arlington, Virginia

Neven Kresic, Ph.D. is an Associate with Malcolm Pirnie, Inc. in the Arlington, Virginia, office (metropolitan Washington, D.C.), and serves as the corporate consultant

for groundwater modeling. Dr. Kresic received his B.S. in hydrogeologic engineering, and M.S. and Ph.D. in hydrogeology and geology from Belgrade University, former Yugoslavia. He is a professional geologist, professional hydrogeologist, and certified ground water professional with over twenty years of international groundwater and surface water-related consulting, research and teaching experience. Dr. Kresic taught at major universities in Europe and the United States, and was recipient of the Senior Fulbright Scholarship for research at the United States Geological Survey in Reston, Virginia. His areas of expertise include groundwater engineering, development and remediation, karst and fractured rock hydrogeology, and groundwater modeling. Dr. Kresic served as Chair of the Continuing Education Committee of the American Institute of Hydrology, is a founding member of the Ground Water Modeling Interest Group sponsored by the National Ground Water Association, and a permanent member of the Karst Commission of the International Association of Hydrogeologists. Dr. Kresic is author of numerous papers and four books in the areas of hydrogeology and groundwater modeling.

Goals:

My goals for the position of VP for International Affairs, would be to:

1. Increase, or establish, presence of AIH in several key international programs of scientific and institutional cooperation in various field of hydrology. Specifically, I would target the UNESCO's "International Hydrological Programme" and its various activities (sub-groups), and the UN "International Decade for Action - Water for Life, 2005-2015" program;
2. Promote and work on materializing the following idea: establish a stipend for bringing two or so young scientists (students) from abroad to our annual conference (and then advertise this through international channels)

3. Initiate a joint scientific committee with a European counterpart (first, and then expand to Latin America) that would work on preparing an academic workshop in Europe in two-to-three years, with the main topic on how to teach (with which tools, which topics, etc.) two key and basic academic "water" courses (one on surface water, one on groundwater) at international universities so that they are compatible and cover same topics of "global importance" (learning about and sharing the World's water resources, etc.)



Candidate for General Secretary
Mr. Emitt C. Witt, III
U.S. Geological Survey
Mid-Continent Geographic Science Center
Rolla, Missouri

Biographical Note:

A member since 2002 (1586 PHQW), Witt is the Director of the USGS Mid-Continent Geographic Science Center, located in Rolla,

Missouri. He has more than 26 years experience as a USGS hydrologist conducting research and project management in the areas of acid deposition, stormwater runoff, organic geochemistry, watershed geochemical characterization, surface water modeling, isotope hydrology, and water quality network development. Witt received his B.S. from Old Dominion University and M.S. from the University of Pittsburgh. He is an active member of the Society of American Military Engineers where he serves on the Environmental Affairs Committee, and is a member of the Army Engineer Association--Ft. Leonard Wood Post. He served as the Organizing Chair for the 2004 AIH annual meeting, currently serves as the AIH General Secretary, and has made frequent contributions to the AIH Bulletin. Witt currently leads an effort to develop a hydrologic technician certification program within AIH.

Goals:

1. To continue strengthening the overall image and membership of AIH.
2. Strengthen the membership in the water quality discipline.
3. Complete development of the hydrologic technician certification program within AIH.



Candidate for Treasurer
Dr. Robert M. Hordon
Water Resources Consultant
Kendall Park, New Jersey

Robert M. Hordon has been a member of AIH since 1984 (#384H). He received his BA in 1959 from Brooklyn College, and his MA and Ph.D. from Columbia University in 1965 and 1970, respectively. He is

currently a faculty member at Rutgers University in New Brunswick, New Jersey, teaching courses in physical geography, hydrology, cartography, and water resources management. His major areas of research are water supply, groundwater yield estimation, and hydrologic data analysis. He has authored numerous publications in the field of water resources and has served on many advisory committees for the Department of Environmental Protection of the State of New Jersey. He is a member of AGU, the New Jersey Section of the American Water Resources Association, the New Jersey Geological Association, and Sigma Xi. Germane to the candidacy for Treasurer, he has recently been re-appointed for another term as a member of the Finance Committee of the Association of American Geographers.

Goals:

1. Work closely with the other members of the Executive Committee on all aspects relating to the proper management of the financial affairs of AIH.
2. Explore opportunities that could lead to additional funding for AIH.

Conceptual Model - continued from Page 3

Where there is cracking, saturated flow, if it can develop, is enhanced. However, for saturated flow to develop there must be a hydraulic head such that there is an energy potential greater than atmospheric.

What is more common is to have a water source near the bottom of the slab; i.e., a high perched water table at or below the slab bottom. Another common situation is poorly drained clays may be present and have enough moisture to provide a water source. Water sources may be drainage from landscape irrigation or rainfall infiltration which has moved downslope under the slab. Consequently, unsaturated flow is the dominant process of interest.

A CONCEPTUAL MODEL OF WATER MOVEMENT

A one-dimensional vertical PC concrete column is assumed with vertical upward movement of water and dissolved salts. At the bottom there are moist soils and at the top it is much drier. Continuous wetting is assumed; i.e., the lower boundary condition stays moist and does not dry out. As a result hysteresis is not a factor. **Figure 1** depicts the physical situation. The total hydraulic head (units of length since the gravitational constant has been divided into each term) is denoted by h where $h = z + p$, z is the elevation head and p is the pore pressure head which is less than zero for unsaturated conditions.

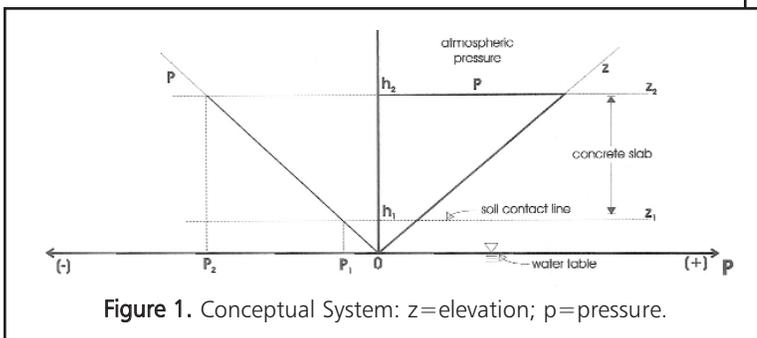


Figure 1. Conceptual System: z =elevation; p =pressure.

For unsaturated conditions p is a function of water content, w (units of vol/vol) as shown in the hypothetical retention curve depicted in **Figure 2**. Numerous measurements, however, have been made on porous media so that there is some general concept of how such a relationship might look for PC concrete. If the top of the column is relatively dry, p_2 is many atmospheres negative while at the bottom of the column, p_1 is negative but near zero.

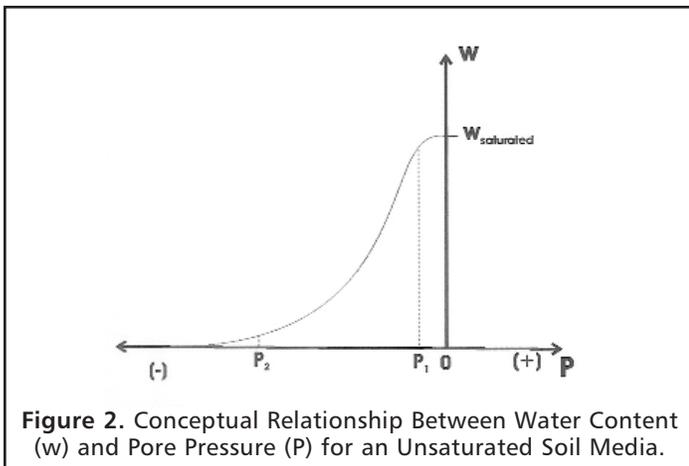


Figure 2. Conceptual Relationship Between Water Content (w) and Pore Pressure (P) for an Unsaturated Soil Media.

Consequently, there is a very large gradient upward; i.e.

$$\text{grad } h = (h_2 - h_1)/(z_2 - z_1) \tag{1}$$

Guymon (1994) discusses the origin of the forces that make up p .

To determine the moisture flux, v , upward, Darcy's law is used; i.e.

$$v = -K(w) \cdot \text{grad } h \tag{2}$$

where $K(w)$ is the hydraulic conductivity which is a function of water content or pore water pressure, i. e., $K(p)$ (Guymon,1994). For most fine grained soils the hydraulic conductivity function changes considerably (over log-cycles) with changes in water content, w .

A complete model applicable to the situation conceptualized here is given by Guymon (1994):

$$M(K(p)M/M)/M = (M_w/M_p) (M/M) \tag{3}$$

Boundary conditions are discussed above. Initial conditions would be a uniform but small water content throughout the column. (An application of this conceptual model including phase change is found in Kim and Heydinger, 2002).

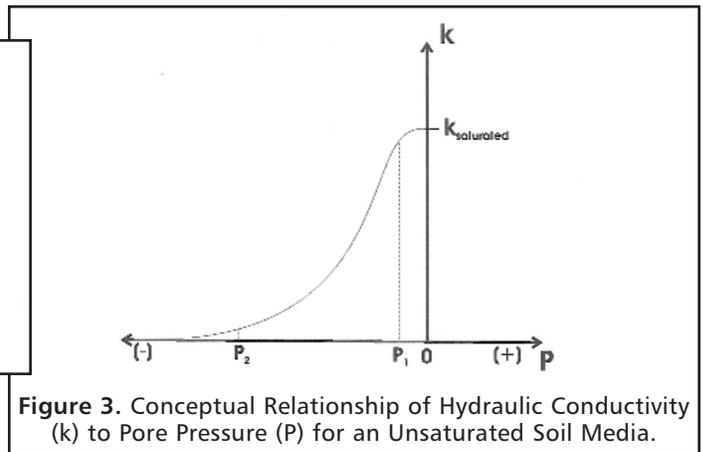


Figure 3. Conceptual Relationship of Hydraulic Conductivity (k) to Pore Pressure (P) for an Unsaturated Soil Media.

Figure 4 shows the wetting process in the one-dimensional PC concrete column. Upward moving wetting fronts are a result of a wet condition at the bottom of the column and drier conditions at the column top. Very strong upward pressure gradients dominate the process. After a long time, moisture flux is in equilibrium and quasi-steady-state is achieved and Equation 3 reduces to Equation 2. Moisture is continuously supplied by the underlying soil, is transported through the column, and exits the surface as evaporation where it may condense in floor coverings. This is similar perhaps to a desert situation where there may be a water table below the surface. It is well known in Boy Scout lore that a desert survival technique is to place a sheet of plastic or tarp over the surface and arrange it so its underside will drain into a container. During the night groundwater moisture collects on the bottom side of the covering and drains into the container.

To make a very rough calculation of how much moisture might be transported, assume a vertical PC concrete column 10 cm tall. At the bottom assume p_1 equal zero and assume at the top p_2 equal -1,000 to -10,000 cm of water. Assume the log-averaged hydraulic conductivity is 10^{-11} to 10^{-13} m/s. From Equation 2, the hypothetical velocity flux ranges from about 0.01 mm/day to 10 mm/day.

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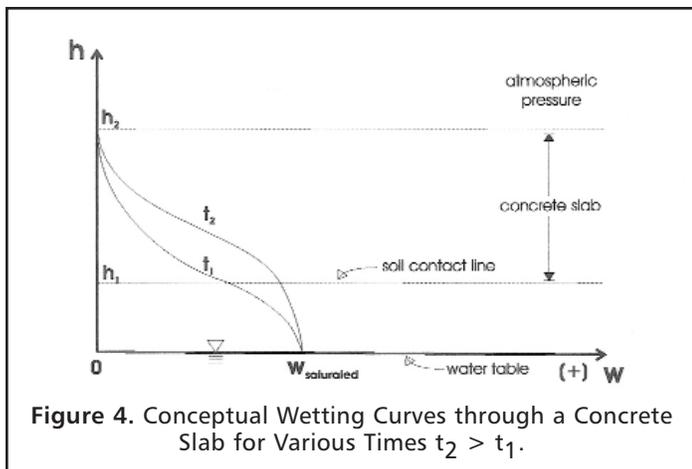


Figure 4. Conceptual Wetting Curves through a Concrete Slab for Various Times $t_2 > t_1$.

A CONCEPTUAL MODEL OF DISSOLVED SALT TRANSPORT

An underlying soil water is envisioned that has dissolved salts but the solution is dilute. We are particularly interested in the sulfate ion which apparently is a major component of salts deposited on floor surfaces. How does the sulfate get there?

The dissolved sulfate is being transported with the upward moving water. It is well known that sulfate in dilute solutions is miscible with water and that it does not react with most porous media (Hillel, 1980a,b). Consequently, the appropriate mass transport model is (Guymon, 1994):

$$\frac{\partial C}{\partial t} + v_s \frac{\partial C}{\partial z} = \frac{\partial}{\partial z} \left(D \frac{\partial C}{\partial z} \right) \quad (4)$$

where C is the concentration, t is time, z is the vertical coordinate, v_s is the seepage velocity (v/w), and D is the dispersion coefficient. At the bottom of the column the sulfate transport boundary condition is approximated by some constant concentration. The appropriate top boundary condition is open to question. If it were $\frac{\partial C}{\partial z} = 0$, we could obtain an analytical solution to Equation 4. For an initial condition, one might assume the sulfate to be a uniform concentration of zero. The solution is not sensitive to the initial condition over a long time period.

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AIH will post job opportunities for hydrologists nationwide on our website. For more information and ad rates please contact AIH Headquarters at Aihydro@aol.com or call 770-384-1634.

Candidates looking for positions should frequently check our website for new opportunities.

www.aihydro.org

**OUTREACH NOTICE - PLUMAS NATIONAL FOREST
Quincy, California**

The Plumas National Forest, Supervisor's Office, has the following vacancies currently open. These positions are permanent, full-time employment. Positions are being advertised interdisciplinary in professional series:

- Supervisory Biologist (0401)
- Supervisory Hydrologist (1315)
- Ecosystems Staff Officer, Interdisciplinary

If you have any further questions about these positions or the application process, please call one of the following Mt. Hough Ranger District personnel:

- Jim Pena, Forest Supervisor 530-283-7810 jpena@fs.fed.us
- Rob MacWhorter, Deputy Forest Supervisor 530-283-7810 rmacwhorter@fs.fed.us

**Hydrologist
2 Positions**

The State of New Mexico ~ Office of the State Engineer

These positions within the Hydrology Bureau will manage projects and perform technical evaluations in support of water rights administration and interstate stream compact compliance. These advanced level positions require professional expertise in the development of hydrologic models, characterization of hydrogeologic conditions, evaluation of well impacts, and surface water assessments.

Position qualifications include a MA/MS in engineering (water resource, civil, environmental, agricultural), hydrology, geohydrology, water resource mgmt &/or physical science, and five (5) years experience in any of these areas. Experience in project management is also highly desired. Salary range is \$43,064 to \$76,556. Position location is Santa Fe, NM.

Applicants must apply through the State Personnel Office. Please see website www.state.nm.us/spo/ for application and how to apply. Please refer to **TOOL#550-05-07-00-00-85** (working title Water Resource Master). Mail a copy of application with transcripts and resume to L. Haught @ OSE/ISC, Hydrology Bureau, PO Box 25102, Santa Fe, NM 87504-5102. Open 3/6/06 - 3/17/06.

The Office of the State Engineer/Interstate Stream Commission is an Equal Opportunity Employer.



American Institute of Hydrology 25th Anniversary Meeting

& International Conference

on

“Challenges In Coastal Hydrology and Water Quality”

May 21 - 24, 2006

Baton Rouge, Louisiana, USA

CONFERENCE INTENT

More than half the world's population lives within a distance of 100 km from the coastline, and this number is expected to increase by 25% in the coming two decades. The population growth and urbanization have largely altered the natural pathways of coastal waters that are vital to the coastal environment. As most of the water on land surface enters into the oceans, man's activities in both coastal and inland watersheds have led to increased loading of sediment, toxic substances, nutrients and pathogens with subsequent eutrophication, algal blooms, and hypoxia. Climate change has led to the rise in sea level with loss of coastal wetlands and to increased saltwater intrusion. The recent tsunami in the Indian Ocean has again alarmed man's vulnerability to nature. World's coasts are facing increasingly serious environmental challenges, while it is not clear how to fully measure the complexities of coastal systems.

This conference aims to provide an international forum for the dissemination and exchange of information in coastal hydrology, hydraulics and water quality. The conference will stimulate interdisciplinary research, education, management, and policy making from physical, biogeochemical, and socioeconomic perspectives related to complex environmental systems in coastal regions. Discussions will also take place on hydraulic engineering and structures in coastal areas, which are frequently densely populated or sites of major industrial development. The topic of coastal petroleum and land subsidence will also be addressed.

CONFERENCE VENUE

The conference will be held at:

Holiday Inn Select & Executive Center
4728 Constitution Avenue
Baton Rouge, Louisiana

The conference rate will be \$81 plus tax (USD) per night, for single or double occupancy. Rooms must be reserved before **April 19, 2006** by directly calling:

800-678-4065 or 225-925-2244
Online at www.holiday-inn.com (Code C94)

**Please indicate that you are participating in the AIH Conference,
Block Code C94.**

WHO SHOULD ATTEND

This conference is recommended for scientists and engineers in all fields of the hydrologic sciences, government officials with environmental responsibilities, land-use planners, students of

hydrology, hydrologists wishing to become registered, and all other persons dealing with water-related issues. This conference will provide a forum for discussion and exchange of information on a broad spectrum of areas in hydrology, hydrogeology, water-quality, water resources, planning and management, aquatic and marine biology, and climatology.

TECHNICAL PROGRAM

- Plenary Opening Session, Central Theme: The Mighty Mississippi and Coastal Louisiana - Past, Present and Future
- Hydrologic and Coastal Processes
- Hydrological Pathway from Terrestrial to Coastal Ecosystems
- Large River Engineering and Management
- Fluvial Processes and Sedimentation
- Flood Control and Disaster Assessment
- Surface and Ground Water Interaction in Coastal Regions
- Fresh Water Resources and Saltwater Intrusion
- Eutrophication and Hypoxia in Coastal Waters
- Coastal Erosion
- Coastal Wetlands and Floodplains
- Coastal Wetland Restoration
- GIS Applications in Coastal Hydrology Studies
- Extreme Weathers
- Socioeconomic Impacts of Extreme Weathers
- Potential Global Change Effects on Coastal Water Resources
- Coastal Water Quality and TMDLs

EXHIBITORS

Exhibit booths will be located in conjunction with poster presentations and break refreshments. This will guarantee direct access to the professionals who are actively employed in the field of hydrology. For information on displaying your product or service at this conference, please contact the AIH office directly at **770-384-1634** or send an email to AIHydro@aol.com.

! Important Notice about Venue !

All members are asked to book their hotel reservations for our 2006 Conference in Baton Rouge, Louisiana, directly through the hotel, Holiday Inn Select Executive Center, and avoid any internet travel providers. AIH will not be given credit towards its master account commitment should you book your room outside of the hotel. This is part of the way that AIH can contain its expenses for conferences. Make sure you identify yourself as a participant of the American Institute of Hydrology's conference. Thanks for your cooperation.

Continued on Page 9

PROPOSED FIELD TRIPS

- Tour of New Orleans
- Tour of Old River Control Structures

SHORT COURSES & REFRESHER CLASSES

- **Hydrogeologic Field Methods - Ground Water**

Instructor: Dr. John Moore, P.H.G

Cost: AIH Members \$150, Non-Members \$175, Students \$50

Sunday, May 21, 2006 from 8:00 AM to 5:00 PM

Includes guides for site investigations and report preparation. The objective of this course is to present current standards methods, and guides for planning and undertaking hydrogeologic field investigations. The guides were developed to produce uniform and high quality data. The course will focus on field methods to define environmental site characteristics. The course emphasizes conceptual models, water level measurements, well inventory, well drilling, aquifer tests, computer programs, sample collection, project planning, and report preparation.

- **Hydrogeologic Field Methods - Surface Water**

Instructor: Kevin Labbe, YSI/Son Tek

Cost: AIH Members \$150, Non-Members \$175, Students \$50

Sunday, May 21, 2006 from 8:00 AM to 5:00 PM

This course will consist of class room presentations and field demonstrations. The instructor will demonstrate the application of the principles and methods used in surface water hydrology and water quality monitoring. Students will be introduced to some of the most advanced field techniques and current technology equipment.

- **AIH Fundamentals Review Class**

Instructor: Dr. Peter Black

Cost: All Participants \$100.00

Sunday, May 21, 2006 from 8:00 AM to 5:00 PM

In the Fundamentals Refresher Course, participants will review the type of testing, and will practice working example questions. There will be a study guide for each student. The instructors will explain the structure and organization of the test. They will also answer questions and work with the participant to complete example questions.

- **Principles and Practice Review - Ground Water**

Instructor: Dr. Peter Rzepecki

Cost: All Participants \$100

Sunday, May 21, 2006 from 8:00 AM to 5:00 PM

In the Ground Water Refresher Course, participants will review the type of testing, and will practice working example questions. There will be a study guide for each student. The instructors will explain the structure and organization of the test. They will also answer questions and work with the participant to complete example questions.

- **Principles and Practice Review -- Surface Water**

Instructors: Dr. Song-Kai Yan

Cost: All Participants \$100.00

Sunday, May 21, 2006 from 8:00 AM to 5:00 PM

In the Surface Water Refresher Course, participants will review the type of testing, and will practice working example questions. There will be a study guide for each student. The instructors will explain the structure and organization of the test. They will also answer questions and work with the participant to complete example questions.

- **Methyl-Tert-Butyl Ether (MTBE) & Other Fuel Oxygenates: Characterization and Remediation**

Instructors: Joseph Haas, Michael Hyman and Eric Nichols

Cost: All Participants \$350

Thursday, May 25, 2006 from 8:00 AM to 5:00 PM

Solutions via Applied Science Associates has designed this full-day training course to enhance your professional awareness of all technical issues related to acute impacts of MTBE and OFO's. A balanced program offering both theoretical and tested field based examples covering site characterization, remediation and technology implementation. This course has been approved by several state boards of engineering and geology in fulfillment of eight continuing education units (CEUs). You will receive detailed exposure to tested advanced strategies for employing specific methods, processes and technologies for the assessment and remediation of acute environmental impacts stemming from the release of oxygenated motor fuels. The course will be 8 hours on Thursday, May 25, 2006 and cost \$350. If you are interested in this course, please let us know by contacting AIH at the numbers listed below or send an email to aihydro@aol.com or svasa@globalhydroserv.com, or contact J.E. Haas at (631) 673-9544.

AIH Certification Examinations - AIH will administer examinations to pre-approved candidates on Thursday, following the close of the Annual Meeting. No other testing venue will be available for this test. Anyone planning to take an AIH certification examination in May 2006, must plan to take the test in Baton Rouge on May 25, 2006.

CONFERENCE PLANNING COMMITTEE

- Vijay P. Singh, Louisiana State University
- Y. Jun Xu, Louisiana State University
- Pinki Diwan, LSU Foundation
- Toni Smiley, BRACVB
- Pat Leahy, USGS
- Miguel Marino, UC, Davis
- Larry Rouse, Louisiana State University
- Daniel Thomas, Louisiana State University
- Clinton Willson, Louisiana State University

Advisory Committee:

- Dr. L. Douglas James
- Dr. Alex Zaporozec
- Dr. Vijay Singh
- Dr. Ken Brooks
- Dr. Joe Rosenshein
- Dr. Gerald Seaburn

Organized with the cooperation of:

LSU
Louisiana State University



Registration Form



American Institute of Hydrology 2006 Annual Meeting & International Conference "Challenges in Coastal Hydrology and Water Quality" May 21-24, 2006 Baton Rouge, Louisiana

PLEASE CHECK ONE:

AIH Member Non-Member Conference Participant

FULL REGISTRATION:

Includes admission to all conference sessions, final program, Awards Dinner, Proceedings copy, breaks, planned luncheons and receptions.

AIH Members & Participants	\$350 (by 3/15/06)	\$450 (after 3/15/06)	\$ _____
Non-Members	\$395 (by 3/15/06)	\$495 (after 3/15/06)	\$ _____

ONE DAY REGISTRATION:

Includes admission to all conference sessions, final program and breaks on the day for which the participant is registered.

___ Sunday	___ Monday	___ Tuesday	___ Wednesday
AIH Members & Participants	\$150 (by 3/15/06)	\$175 (after 3/15/06)	\$ _____
Non-Members	\$160 (by 3/15/06)	\$185 (after 3/15/06)	\$ _____

STUDENT REGISTRATION:

Includes admission to all conference sessions, final program, breaks and receptions.

AIH Members & Participants	\$25 (by 3/15/06)	\$30 (after 3/15/06)	\$ _____
Non-Members	\$25 (by 3/15/06)	\$30 (after 3/15/06)	\$ _____

ACCOMPANYING PARTNER:

Includes admissions to breaks and Awards Dinner (Does not include admission to the conference sessions.)

Name: _____

AIH Members & Participants	\$35 (by 3/15/06)	\$40 (after 3/15/06)	\$ _____
Non-Members	\$40 (by 3/15/06)	\$45 (after 3/15/06)	\$ _____

MEALS FOR ONE DAY, STUDENT, PARTNER/SPOUSE AND GUESTS:

Monday Luncheon	\$25 (by 3/15/06)	\$30 (after 3/15/06)	\$ _____
Monday Awards Dinner	\$40 (by 3/15/06)	\$50 (after 3/15/06)	\$ _____
Tuesday Luncheon	\$25 (by 3/15/06)	\$30 (after 3/15/06)	\$ _____
Wednesday Luncheon	\$25 (by 3/15/06)	\$30 (after 3/15/06)	\$ _____

PROCEEDINGS:

Additional Copies	\$60	\$ _____
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TOTAL AMOUNT DUE:

\$ _____

HOTEL DURING MEETING:

CANCELLATION POLICY:

- Before March 15, 2006 - Registration Fee, less \$50.00
- Between March 15, 2006 and April 15, 2006 - 50% of Registration Fee
- After April 15, 2006 - No refund allowed

Cancellation must be received in writing at AIH Headquarters by dates

★ SPECIAL OFFER TO NON-MEMBERS ★

AIH will waive your Membership Application Fee (a \$75 Savings!) For Non-members attending with a Full Registration. Your application must be received at AIH within 60 days from date of the conference. Applications available at Conference Registration desk or Online at www.aihydro.org.

REGISTRATION INFORMATION

Name: _____

Title: _____

Company: _____

Address: _____

City: _____

State _____ Zip: _____

Country: _____

Phone: _____

Fax: _____

Email: _____

Please send information on Short Courses to me? _____ YES _____ NO

PAYMENT METHOD

Full payment must accompany completed registration form.

Check:

Payment made by check (Only U. S. Dollars, drawn on a U. S. Bank) payable to AIH Conference.

Check No: _____

Purchase Order No: (if applicable) _____

Credit Card: (check one)

___ Visa ___ MasterCard
___ Amex ___ Diner's

Card No: _____

Expiration Date: _____

Cardholder Signature: _____

Date: _____

Please return this completed form with full payment to:



AIH Conference Headquarters
300 Village Green Cir., Suite 201
Smyrna, GA 30080, USA
Tel: (770) 384-1634
Fax: (770) 438-6172
Email: AIHydro@aol.com

Organized with the cooperation of:



Meetings, Conferences and Courses

Association of Dam Safety Officials

September 10-14
Boston, Massachusetts

Session Topics and Presenters: Dam Safety 2006: ASDSO's Annual Conference Session Topics and Presenters: TBA. Over 700 attendees expected.

Registration Fee: TBA Exhibits & Sponsorships: TBA

Accommodations: Seaport Hotel and Convention Center. \$179 plus tax/night.

AWRA's 2006 Spring Specialty Conference GIS in Water Resources IV

May 8-10, 2006
Houston, Texas

Early Registration Ends April 17!

Technical Program Highlights: Forty-four oral technical sessions; Superior poster session; Plenary Speaker Michael Talbott, Director of the Harris County Flood Control District on integrating GIS with watershed modeling, flood control, environmental management, and infrastructure planning and maintenance; Exceptional field trip to TranStar -- the preeminent emergency management system. (Registration is Limited!)

For more information visit:

<http://www.awra.org/meetings/Houston2006/index.html>

AIH 25th Anniversary Meeting & International Conference "Challenges in Coastal Hydrology & Water Quality"

May 21-24, 2006
Baton Rouge, Louisiana

An international forum for information exchange and discussion on all aspects of hydrology, hydrometeorology, hydraulics and water quality issues pertinent to coastal processes and environment.

Canadian Water Resources Association B.C. Branch Conference North American Lake Management Society

October 24-27, 2006
Vancouver, British Columbia

For more information contact: Conference Chair, Peter Morgan,
Golder Associates, Ltd. at pmorgan@golder.com

NALMS 2006: Making Connections - People, Lakes, Watersheds 26th International Symposium of the North American Lake Management Society

Hosted by: Indiana Lakes Management Society
November 8-10, 2006
Indianapolis, Indiana

Indiana has a long and rich history in limnology and lakes. The last glaciers, some 10,000 years ago, covered the northern third of the state with natural lakes. There are virtually no natural lakes in the southern two-thirds of the state but there are plenty of impoundments. Indiana's 1400 lakes over 5 acres in size include 8 Corps of Engineers projects (10m700-acre Monroe Reservoir is the largest in the state) and Lake Wawasee, at 2,600 acres, the largest natural lake in the state.

It is in recognition of this rich history that the theme of the 2006 NALMS International Symposium is derived. This Symposium will emphasize connections between natural lakes and reservoirs; between watersheds and lakes; and, of course, between people and lakes.

The Call for Papers is now available and can be found on the conference website at <http://www.nalms.org/>.

This year's Indianapolis, Indiana venue, known as the "Crossroads of America" provides an easy connection from anywhere. Please visit <http://www.nalms.org/> for complete details and information as they become available:

Registration materials will be available in June.

Welcome Kathryn Mills

We are pleased to announce that Kathryn Mills has joined our work force as our Support Services Coordinator. Her extensive background as a Customer Service Agent for Delta Airlines (over 17 years) makes Kathryn suited for the challenges of the everyday tasks of answering the many telephone calls, computer skills and other business aptitude.

For AIH, Kathryn will be the first voice that you will hear when you call into AIH headquarters. She will handle all inquiries and requests for information and direct them to the appropriate person for processing. Kathy's duties include word processing, mass mailings, phone answering, and membership application processing.

Please join us in welcoming Kathryn Mills and feel free to call to introduce yourself to her, or with any concerns or questions about your membership with AIH.

American Institute of Hydrology
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Email: AIHydro@aol.com Website: www.aihydro.org

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Remember the Alamo

Did you know that AIH receives a commission for all member rental of vehicles through Alamo Rent a Car? A 24-hour reservation is required and can be made by calling **1-800-354-2322** and request your membership ID No. as **690339** with the rate code **BY**.

Do You Miss Your Bulletin?

If you have not read your Bulletin during the past 6-9 months, you may not have heard that AIH has decided to forego the postage charges and make the Bulletin available online at www.aihydro.org. The Bulletin is still the place to go to get all of the latest activities of AIH and all of colleagues. Some of the regular topics include:

Job Opportunities - Check this department regularly. We post employers job opportunities. These are for more advanced positions and are well worth your time to review on a regular basis.

Current Affairs and Special Projects - The Bulletin is the information source for virtually all the projects underway in AIH. Please visit your web site and see what is going on in AIH.

If you do not have an email address or if AIH does not have your email address, please let us know and we will mail you a paper copy of the Bulletin.

Speakers Bureau

Following the disaster of Hurricanes Katrina, Rita and Wilma, AIH received several phone calls from news agencies - CNN and NPR - and several of the print media. The reporters were mainly interested in talking to experts on or off camera to gather information and become more knowledgeable of the causes and effects of these hurricanes. They also wanted to have access to experts living in the area to hopefully help them develop a story.

AIH wants to be able to respond to these requests. We want to be known as the "go to" organization for reporters to contact our experts in these areas.

To respond to this need, AIH has proposed to develop a Speaker's Bureau and solicit volunteers to offer themselves as "Experts" to a variety of groups, from small children to national news agencies. We would offer this service at no charge to the user, but with limited access (temporary password) to the Speaker Bureau Registry and the members in the Speaker's Bureau. AIH would provide access to our experts by using our already existing online Registry. With several modifications, AIH could implement the services without difficulty. Participating members would define their area of expertise and any limitations on the scope of their service.

You will be advised of this program as we develop it further. Your input at any time is welcomed and solicited.