American Institute of Hydrology
Newsletter
The Society for Certification of Hydrology Professionals

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AIH is here to serve the profession and the members

• AIH is the only organization that certifies professionals in the fields of surface water and groundwater hydrology, and water quality both nationally and internationally.

• AIH provides educational training venues to the professionals in the field of hydrologic sciences.

• AIH speaks to lawmakers on behalf of you and the profession as an advocacy

Inside This Issue

President's Message

Dear AIH members:

I am pleased and honored to serve as the American Institute of Hydrology's president for 2013-14. Folks who know me also know that I am brief with words so let's get right to it…

The American Institute of Hydrology has a number of challenges ahead, but the future is bright. The mission of AIH, I think, is most succinctly stated in three of the purposes found in Article II in our constitution):

- To strengthen and to promote hydrology as a science and as a profession.
- To establish and implement qualifications for the certification of professional hydrologists.
- To establish ethical standards in the practice of hydrology for the protection of public health, safety, and welfare, and to safeguard the profession from nonprofessional practices.

At the core of this mission is the certification of professional hydrologists and hydrologic technicians. It's that simple. Many scientific organizations have seen their memberships drop over the last several years due to a flat economy, agency restrictions on travel, etc. AIH did not escape this trend - our membership declined and, thus, so did the number of certified professionals. This is a trend worth reversing.

AIH's reasons for being are noble and perhaps most succinctly captured in the phrase "the protection of public health, safety, and welfare." Professionals in the field of hydrology are passionate about their work and their calling. The resource we strive to protect and use for the benefit of society and the natural world is paramount. Because of that commitment, passion, and importance, AIH is poised to grow and fulfill its mission. But it can only happen if you get involved. If you are currently certified as a professional hydrologist or hydrologic technician, remain so. Mentor those just entering the field to work toward certification. Encourage colleagues to become certified. Talk about certification to others at meetings of AIH and our sister organizations. Encourage your company or agency to reward certification. Volunteer to help write the certification exams. There are many ways to move AIH, its mission, and, most important, the profession forward.

I look forward to the next two years and I hope to meet and work with many of you. Please let me know – at any time – your thoughts and ideas. My email address is stephan.nix@tamuk.edu. I would like to hear from you.

Stephan J. Nix, PhD, PH
President, AIH

AIH Goes Global
Mustafa M. Aral

As we have read and heard in the print, visual or virtual media Scientist, Economists, Managers and Legislators always refer and treat current issues on Climate Change, Sustainability, Food shortages, Extreme Weather Events and many other topics as “Global Issues” of a “Global Village” which we used to call our World in the old days. Along those lines, there are some positive developments in the globalization of AIH as well which I would like to share with the membership of the AIH in this note.

As I have indicated in my nomination mandate for the future presidency of the AIH, I was interested in contributing and expanding the international activities of the organization when I considered this position. In that regard and in the role as the President Elect of AIH I have been in contact with the European Hydrologic Community to initiate some activities beyond the borders of the USA for AIH. Currently the European Hydrologic Community is in the process of organizing a networking community between the hydrology professionals of the nations of the European Union. This community of hydrologists has now extended beyond the borders of the European Union as well. I have been in contact with this group and the outcome of those meetings at conferences and some email exchanges lead to the conclusion that AIH will join this hydrology networking group as the Founding Member of the group.

Currently the founding members of this group, beyond members at large, are:

American Institute of Hydrology (AIH)
Association of Hydrologists of India (AHI)
British Hydrological Society (BHS)
Canadian Geophysical Union - Hydrology Section (CGU-HS)
Canadian National Committee for IAHS (CNC-IAHS)
Chilean Association of Hydraulic Engineers (SOCHID)
European Geophysical Union - Hydrological Sciences Division (EGU-HS)
French Committee for Hydrological Sciences (CNFSH)
Italian Hydrological Society (SII)
Nigerian Association of Hydrological Sciences (NAHS)
Netherlands Hydrological Society (NHU)
Nordic Hydrological Association (NHF)
Norwegian Hydrological Association (NHR)
South African National Committee of IAHS (SANCIAHS)

What will this mean to AIH in general and also to our membership? First of all, as a founding member of this new organization, AIH is now in a position to influence the hydrologic community activities and decisions globally through the joint activities of this international group. This influence may appear in the form of advising global lobbying activities on global issues of our Global Village or this may take the form of information exchange between the members of these groups on topics of relevance. This leadership role will also take the form of providing support to our current and future members in creating a connection hub to the hydrology professionals outside USA. I think some of the international projects that are pursued by our members will benefit significantly from the possibility of this contact. This in turn will render AIH a more valuable organization for its members as well.

The decision to join this international community was voted on positively by the Executive Board Members of AIH recently and I wanted to share this information with the membership of AIH. More to come on this activity in the future and I also would like to hear your comments as well.

Mustafa M. Aral
President Elect AIH
maral@ce.gatech.edu
September 20, 2013

Basswood Spring Bottled Water Plant, Platte County

With an abundance of clear bubbling springs in the Ozarks of Missouri, I thought it odd to receive a request for a bottled water facility in North-West Missouri. The area between Kansas City and St. Joseph is an area underlain with Pennsylvanian age limestone and shale bedrock. Neither of these types of rock yield much water and the little water that is produced is typically mineralized and of low quality. So the question occurred to me; why would anyone want to bottle this water?

Premium Waters Inc. invited me to visit the site. So, on a cool February day I met with Mark Reynolds, a representative of Premium Waters and their hydrologist at the spring in Platte County. They took me to a small spring house nestled on the side of a hill. Below the floor, under a protective cover shimmered crystal clear water. Below the spring house, water flowed through a series of pipes and holding tanks. “It yields around 22 gallons per minute,” said James de Lambert, a hydrogeologist for Liesch and Associates. “We have been monitoring it for a while and it doesn’t change much.” Per 1920’s historical records, the water was bottled by a Kansas City entrepreneur, A.J. Stevens. Since then it has been sold for bulk, non-potable use.

Within the neighborhood of the spring I noticed very large pink boulders. As a geologist I recognized them as Sioux Quartzite. The Sioux Quartzite is metamorphic sandstone native to the state of Minnesota, South Dakota and Iowa. It occurs in Missouri as glacial erratics around the northwestern quarter of the state. These erratic boulders are carried south on the backs of Ice-age glaciers. You can see them along roadsides where ditches, ponds or other excavation have been done, but they are usually isolated and never in abundance. But here at Basswood Spring they are all over, used for decoration around every cabin, RV slip, roadside and picnic table. I thought, “What could be the source for all this heavy material?”

Well, it did not take long. A short drive from the spring lays a recent cut in the hillside to accommodate more RV slips. The 20 foot high cut revealed an unsorted and random assemblage of pebbles, sand, cobbles and boulders. Pink Quartzite cobbles were included in the mix as well as capping the deposit in what is known as a “stone line.” Below the assemblage lay another 10 feet of weakly sorted gravels that are lying in beds dipping at about 15 degrees. Apparently these lower dipping gravels have been placed by swift moving water, but were not in the water long enough for natural sorting of the material to occur. What could have caused this?

Well the answer is one that Missouri geologists have been looking for a long time. It is well known that about 600,000 years ago glaciers covered Missouri North of the Missouri River. Glacially derived materials such as erratics, till and loess can be found throughout the Northern half of the state. Eons of time has passed since their deposition and weathering and erosion have moved and carried the materials from their originally deposited position. As such, no one has been able to draw a line in the sand and say, “this is where the glaciers stopped,” until now.

The type of glacial deposit found at Basswood Spring is known as an end moraine. It formed when the glacier paused or stopped its advance. Boulders and other material was carried by the glacier and deposited to form a long type of shallow hill. Fortunately, this hill was deposited in a pre-glacial valley. In fact the valley was filled in by glacial boulders and gravel. The aftermath of the glacial period left a flat plain with a vast shallow lake to the south known as Lake Ferrelview. Streams flowing from the melting glacier quickly worked on the loose glacial material cutting gullies moving the finer materials into the lake. Most of the moraine was washed away by erosion of the early Platte and Missouri rivers, but a small portion was preserved intact with in the pre-glacial valley at Basswood Springs.

Today, the deposit of gravel left by ancient glaciers serves as an aquifer. The sand and gravel soak up the rains and hold the water with the formation like a sponge. When the amount of rainfall exceeds the amount of water the formation can hold, it leaks out forming a spring.

The Basswood Spring water is of a higher quality than surrounding groundwater because it is not in contact with the local bedrock. The bedrock is composed of limestone and shale that contain reactive minerals that cause hardness and negatively effects taste. The minerals that form the Basswood Spring aquifer are relatively inert and yield soft, clear water.

HYDROLOGY: for the water-interested public, students, teachers, and government officials.

(Some clarification of terms for the public and the professional working with water)

By Peter E. Black , Distinguished Teaching Professor of Water and Related Land Resources, Emeritus
State University of New York College of Environmental Science and Forestry, Syracuse, New York.

As a widely used term, “hydrology” has several definitions and applications. Some are clear to professionals, but not necessarily to the lay public. The consequence is a disconnect that helps fuel misunderstanding and confusion of the term, not to mention ignoring its importance. Specifically, the word is NOT synonymous with “water” although the term does focus on and is delimited by that natural resource. The public, of course, if not well informed misuses the term much to the concern of hydrologists at least, and others may not do much better!

Nevertheless, there is a clear – and somewhat flexible – meaning (application) of the word “Hydrology” that is generally accepted by professionals as “the science of water on Planet Earth”. More generally, “hydrology is the study of water in both the natural and disturbed environments. Probably the oldest correctly recorded hydrological observer was the author of Ecclesiastes, who wrote The rivers run into the sea, yet the sea is not full. Leonardo da Vinci and Bernard Pallisy in the Fifteenth and Sixteenth centuries were important observers of nature but even da Vinci made some mistakes and may have been the source of misinformation that the oceans produced springs by pressure originating in mountainous regions. Scientific hydrology really began with Pierre Perrault, who with Edmế Mariottế published On the Origin of Springs in 1687. By measurement, he determined there was sufficient precipitation on the newly defined Seine River watershed to supply a year’s runoff, thus defining the basis for the hydrological cycle”   Many writers in the 20th and 21st centuries have helped fill in the many details of the hydrological cycle along with the understanding of the science that underlies the behavior of H2O in all its forms as well as the natural variety of their environments complicated by changing conditions.

Since water is ubiquitous on this planet and, as such, plays a prominent and essential role in seasonal weather behavior, the term “hydrology” is blessed (cursed?) with a wide variety of relationships, appearances, and roles (dependent upon the latitude, time of year and Earth’s location when considering it). That variety of course includes the “behavior and appearance of water” and, since that life-supporting compound takes on a wide variety of many naturally related and vital forms, the words, “water” and “hydrology” are often misused.

Those linkages are quite notable in the several specialty areas of the science of water, including freshwater and oceanic ecology (the two being different in some ways and similar in others); weather (atmospheric ecology – for want of a better term), and the behavior of water in a variety of environmental settings that might include biomes, the atmosphere, water bodies (ocean, lakes, streams, and snow-and-ice); and all water-based life forms;

Perhaps the most important thing(s) about water on Planet Earth (and probably elsewhere in the Universe) is the great variety of visual, physical, and functional contexts that characterize the particular portion of our watery environments. Fundamental to the understanding of how water behaves (appears, changes, functions, etc) is the recognition of the physical construct of the water molecule and the water body (context) within which it is being observed, used, managed, or studied. There are, from place to place, a wide variety of characteristics of water including appearance, relationship to other natural resources, and responses to environmental conditions with which water interacts, thus weather, water body variety, relationships to water in (and the entire) atmosphere and plant-and-animal environments.

It is, in fact, all of the foregoing (and then some!) that constitutes a broad definition of “hydrology”. The linkages, interrelationships, similarities, and behavior of water in response to the tremendous variety of environmental conditions is, in sum, what constitutes the term “hydrology”. That includes human control and intervention of hydrological environments by alternations in the natural environment, along with analogous behavior within all aquatic systems, including the human body and immediate environment. Despite all the ramifications and necessary considerations (study, natural environments and environmental relationships, human influence(s), and relationship between Earth’s energy balance and our ocean and atmosphere, there are also some incredible similarities – constant behavioral relationships between Earth’s several environmental “niches (not always minuscule), and the concept often implies and/or is envisioned.

For example, there are some constant characteristics of all *well, almost all) aquatic systems. Thus, it is appropriate to be aware that common characteristic of (at least most) aquatic systems is that they all flush, that is discharge waste products in short-term periods, and this applies to rivers, streams, wetlands, lakes, and even human bodies. All exhibit a common characteristic that is definitely hydrological in nature. (Oh, yes, Earth’s ocean: there is, in fact, only one, although humans have identified a variety of sub-parts all of which happen to be linked physically and are large enough to exhibit some unique or similar place-based differences in timing, life forms, temperature, and temporal behavior such as wind characteristics, circulation system characteristics, etc. In examining the importance of sand-and-gravel bars that naturally build up where typical stream enters ocean, I awoke one morning recently to find myself rubbing my eyes (as most of us do). That turned out to be An “Ah Hah” moment as I noted that I was removing bodily “sand and gravel” from remains of liquid from my eyes, just like a live stream. And, why shouldn’t there be similarities between humans and environmental aquatic systems?

Thus, in general terms and view, Hydrology is the term used to define how Earth’s aquatic environment works and, no doubt, on other earth-like systems. If we understand such details, we can do a better job of managing that which supports our very existence: Hydrology (the science); Water (the substance); the basis for life as we know it on our spaceship Earth; We must understand how to manage our water-- with understanding of what is likely similar on other “earth’s” – in order to persist. All that is, a matter of faith, but we must use the intelligence, and understanding of Earth’s life-preserving aquatic systems, functions, and behavior to survive.

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[1]Black, P. E., 2012: Water Drops, p. 75-88, identifying many hydrological processes; SUNY Press, Albany, New York. (The source book is comprised of 168 90-second essays for educational use by Public Radio and are available to professional organizations, and government agencies. The book is available on the Web, and from the Publisher, A complete free listing of all essay titles is at http://watershedhydrology.com, and the recordings are available free at Public radio international: http://publicradiointernational.tumblr.com/ .

Professor Vijay P. Singh appointed Distinguished Professor

Professor Vijay P. Singh, who is currently Professor of Biological & Agricultual Engineering and Professor of Civil & Environmnetal Engineering and the Inaugural holder of Caroline and William N. Lehrer Distinguished Chair in Water Engineering at Texas A&M University, has been appointed Distinguished Professor which is the highest honor the university bestows on its faculty. He has received the Lifetime Achievement Award this year from the American Society of Civil Engineers for his seminal contributions in hydrology and water resources. He has also received the 2013 Hydrology Days Award given by Colorado State University. Professor Singh served AIH as its President and Senior Vice President as well as President of the Louisana Section of AIH.

Here is a news item that may have significant impacts on our profession.

Dr Lorne G. Everett, P. H.; P.H.-GW Chaired the ASTM International Symposium entitled: Continuous Soil Gas Measurements: Worst case Parameters, held in Jacksonville Florida on January 30, 2013. The symposium focused on newly released critical continuous soil gas monitoring data associates with residential and industrial activity around the world. Multiple representatives from the United Kingdom, Canada, Germany, Brazil, etc participated in the Symposium. From oil and gas companies, chemical companies through small industrial sites, there is a growing need to understand and mitigate worst case/explosive or high human health risk conditions. Dry cleaners, gas stations, refineries, fracking sites, landfills, landfill energy systems, machine shops, etc. all can exhibit Vapor Intrusion (VI) risk. Often driven by litigation, the interest in VI into homes and buildings has skyrocketed. Groundwater cleanup costs are dwarfed by the potential for class action VI suits. Recent dynamic risk observations pose serious implications about conventional approaches, best management practices, due diligence and formerly closed sites, and create a need to identify and understand site-specific conditions that warrant continuous monitoring. As such, several regulatory entities are now advocating for continuous VI monitoring and formerly closed sites with no further action letters are being reopened. The forthcoming reduction in the MCL's of TCE and its designation as a human carcinogen will have a dramatic effect on environmental site characterization, remediation and litigation.

Fundamental to the Symposium were the 4 new ASTM Soil Gas Monitoring Standards for Vapor Intrusion developed under ASTM Committee D 18.21.02, Chaired by Dr Everett.

Toward the end of the Symposium a consensus was developed on the following recommendations:

ASTM Symposium Observations and Recommendations

Current regulations and protocol focus on single time step assessment campaigns, as it has been assumed that subsurface conditions are static;
Recent findings at more than 60 sites over the past 18 months suggest dynamic risk conditions can exist;
Correlations between risk and barometric pumping, soil moisture, tidal impacts, groundwater extractions and variable subsurface vapor flows are possible;
There is an immediate need for incorporation of newer detection and data management methods into initial field assessment protocol and regulations/guidance;
There is an immediate need for incorporation of newer detection and data management methods into remediation design and performance assessment strategies;
Since we now know it is possible to encounter dynamic VI risks, in order to avoid missing worst case scenarios, we recommend that continuous monitoring be performed for at least a few selected site locations (e.g., data collection points, DCPs) prior to implementation of an alternative non-continuous geospatial soil vapor survey campaign in the encroachment zone;
Continuous monitoring field campaigns should be performed when barometric pressure changes are anticipated so that practitioners can establish whether risks are dynamic through a range of atmospheric pressure conditions;
If practitioners do not have the luxury or flexibility in their field deployment schedule, then an alternative strategy for testing worst case scenarios would be when a low pressure dominates the site region;
Dynamic soil gas behavior has been recorded in both petroleum hydrocarbon (BTEX/Methane) and chlorinated hydrocarbon (PCE/TCE) sites;
Changes in soil gas concentrations can be very rapid, and can fluctuate multiple times within a day;
Continuous soil gas monitoring of both petroleum VOC's (methane/BTEX) and some chlorinated VOC's (in the ppt range) are now available although more specific ion sensors need to be developed;
Soil moisture can significantly impact soil gas concentrations and ranges, changes over time and space, regional vapor flow;

Soil moisture impacts can be observed under an individual building or home, be linked to vegetation cover, topography, soil type and location of building downspouts;
Other factors to consider include time since most recent precipitation, infiltration wetting front, hysteresis, lithology, evapotranspiration, temperature, tidal fluctuations (e.g., when near shorelines), industrial blowers, etc.

Any interest in the above recommendations or in the development of the new ASTM Vapor Intrusion standards can be directed to Lorne Everett at the address below.

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Sujit Ekka, PE, PH, is a 2013 recipient of International Jennings Randolph Fellowship

Sujit Ekka, PE, PH, is a 2013 recipient of International Jennings Randolph Fellowship awarded by the American Public Works Association (APWA) and the Eisenhower Institute at Gettysburg College. As one of three Jennings Randolph Fellows selected from a field of qualified applicants across North America, Ekka will make a presentation on Durham's stormwater program at the International Public Works Conference in August 2013 in Darwin, Australia. This will be followed by a technical study tour focused on stormwater management practices in Australian cities, and collaboration with Melbourne public works officials and Melbourne Water, the agency that manages Melbourne's water resources.

Ekka began his professional career in Virginia, working for a consulting engineering firm as a design engineer with primary responsibilities in stormwater management and drainage design. His career in public service began as a civil engineer with the City of Charlottesville, Virginia, followed by a Water Quality Analyst position in the City of Durham Public Works Department in North Carolina. He was recently promoted to a Civil Engineer position with supervisory responsibilities in the Stormwater Infrastructure Group. In his current position, he manages a variety of stormwater projects and contracts that include water quality modeling for impaired waters, drainage infrastructure construction and rehabilitation, and stream restoration.

Ekka is a licensed civil engineer and a registered professional hydrologist with specialization in water quality. Ekka has published articles in peer-reviewed journals and presented at local, regional and international conferences. He currently serves on the Board OF North Carolina Water Resources Association and has volunteered in international water, sanitation, and development projects for Nicaragua and India through non-profit organizations. Ekka holds an M.S. in Land and Water Resources Engineering from Virginia Tech, an M.S. in Ecological Engineering from the University of Arkansas, and a B.S. in Agricultural Engineering from India.