Everglades Geological Society

BULLETIN

Volume 7, Number 6 May 2001

Meeting This Month: May 15, 2001
6:00 P.M. at the French Connection Cafe
(social hour starts at 5:00)

Speaker: Dr. Thomas Missimer

Topic: Hydraulic and Density Considerations
in the Design of
Aquifer Storage and Recovery Systems

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Everglades Geological Society
P.O. Box 61684
Fort Myers, FL 33906

The Everglades Geological Society is an organization which seeks to promote interest in and understanding of Geology and the related Earth Sciences, and to provide a common organization for those individuals interested in geology and the related earth sciences. The Bulletin is a publication of the Everglades Geological Society, Inc.

Editor
Gordon Kennedy
gordonk@peganet.com

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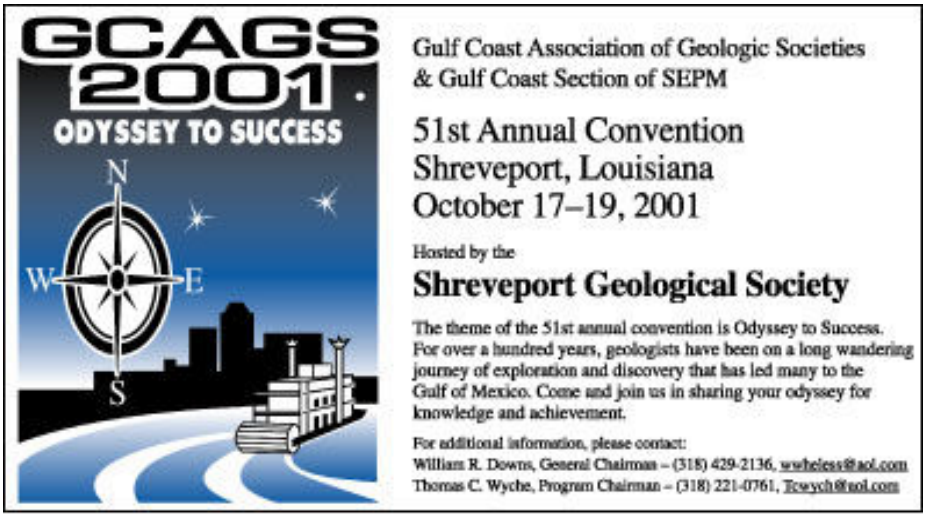
EGS MEETING THIS MONTH
TUESDAY
May 15, 2001

The French Connection Cafe
2288 First Street (at Jackson Street)
Fort Myers, Florida
(941) 332-4443

Gulf Coast Association of Geological Societies



Please welcome new member
John Drobnyk

John is a Professor of geology at Southern Conneticut State University.

Hydraulic and Density Considerations in the Design of Aquifer Storage and Recovery Systems[1]

Thomas M. Missimer, PhD, P.G.
CDM Missimer
8140 College Parkway
Fort Myers, FL 33919
e-mail: missimertm@cdm.com

ABSTRACT

Success or failure of an aquifer storage and recovery (ASR) system is based upon the local hydrogeologic conditions with the predominant factors being the aquifer hydraulic properties and the density contrast between the water in the storage zone and the injected water. If the hydraulic properties are not compatible with the ASR concept being designed, then the system will likely fail regardless of the injection and recovery rate. Most ASR systems with high recovery percentages occur in slightly brackish-water aquifers or in aquifers with a high degree of upper and some basal confinement. ASR systems in confined aquifers containing freshwater always have high recoveries, but there is no real storage achieved because during recovery the impacts to the aquifer are the same as if no water had ever been stored.

Recent modeling of ASR wells proposed for the Everglades restoration project (Missimer and Guo, 1999) shows that great care must be taken in the selection of the portion of the Floridan Aquifer System that can be successfully used for ASR. The upper Floridan Aquifer System along the southeast coast of Florida contains three hydraulic zones that have, from top to bottom, high hydraulic conductivity (zone A), medium to low hydraulic conductivity (zone B), and very high hydraulic conductivity (zone C) (Avon Park high permeability zone). Based on the modeling results, construction of 5 MGD ASR wells penetrating the upper two zones can be designed to achieve 80% recovery of injected water within a 5-year period with annual cycled use (5 months of injection, 3 months of storage, 4 months of recovery) or more rapidly if no recovery is conducted in the first two years. These recoveries are based upon simulations in which the aquifer contains saline water equal to those actually occurring in the system. Another set of simulations showed that if the aquifer contained seawater, an ASR system would fail because of the density differential between the native and injected waters. Also, if the ASR zone selected includes the high transmissivity zone of the Avon Park Limestone, the system also fails or has very low recoveries. This modeling study is consistent with field observations at the north Lake Okeechobee ASR demonstration site, which penetrated high permeability sediments and had low recoveries. Whenever the fluid in the proposed ASR zone has a dissolved solids concentration of over 20,000 mg/l (Ch2M-Hill, 1989), there is a low probability of achieving high recovery rates (Marathon ASR Florida Keys system).

Depending on the proposed injection/recovery rates, the aquifer used for ASR should have a transmissivity ranging from about 50,000 to 350,000 gpd/ft. The aquifer should be well confined at the top and have some basal confinement. The total dissolved solids in the ASR zone should be less than 20,000 mg/l.

BIOGRAPHY

Dr. Missimer is Vice President of CDM Missimer, a subsidiary of Camp, Dresser & McKee, Inc. He received a B.A. degree from Franklin and Marshall College, a M.S. degree from Florida State University, and a Doctor of Philosophy degree in Marine Geology and Geophysics from the University of Miami.

Tom has over 27 years of experience in geology and hydrology, and is the author of numerous technical papers, consultant reports, and is the author of two books. He has been project manager and senior technical advisor for numerous water supply development projects, groundwater contamination assessments and groundwater remediation projects. Dr. Missimer has served as Chairman of the State of Florida Board of Professional Geologists, Chairman of the Technical Advisory Committee for the Governor's Commission for a Sustainable South Florida, and currently serves on the Florida Forever Advisory Committee.

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1 Thomas M. Missimer, Weixing Guo, Charles W. Walker, and Robert G. Maliva

President's Message

By Elizabeth Owosina

(owosinaes@cdm.com)

Dear EGS members:

We are fast approaching the end of the 2000-2001 calendar year for the Everglades Geological Society and the end of my term as President. I would like to thank everyone that cast their votes for next year's officers. The officers will be announced in June. As we wind down the year, I thought I would discuss a number of issues that have arisen over the past several months. The first issue is our affiliation with the Gulf Coast Association of Geological Societies (GCAGS). There has been some discussion over whether the EGS should re-apply for membership with GCAGS. As you may remember, our last request for membership was denied in 1997.

Some EGS members believe that we can present a strong case for membership to the GCAGS Board of Directors. These members note the fact that the EGS has now been in existence for over six years. During this time, the society has maintained monthly meetings from September to June in which scheduled speakers have presented on a wide range of geologic topics. The society has also sponsored several field trips including a tour of a phosphate mine in central Florida, a weekend trip to Gainesville, and several canoe trips on the Peace River. Other members question whether the EGS would be able to successfully carry out our responsibilities as members, such as hosting an annual GCAGS convention, which would be a very big undertaking.

If you have an opinion on this issue, please let us know. You can write to the EGS, call a Board member, send an e-mail, come to a meeting. We would like to hear from you. This is an important decision for our society. I'd like to note that Duane Dungan and Clyde Dabbs have offered to present a formal application for membership at the annual meeting of the Board of Directors on October 24, 2001, in Shreveport.

Second, I would like to discuss our current membership situation. Our general membership has declined over the past several years, although attendance at monthly meetings has remained relatively consistent. We have occasionally had exceptional turnouts at meetings when we have had 'distinguished' speakers. It is at these times that I remember that there are a significant number of geologists in our area. Many of these geologists, though, just don't consider the EGS to be a high priority. I know that this is not just an EGS problem. I have heard about similar situations with other professional groups, such as the SEGS and the local chapter of the AWG.

I am aware that the limited amount of free time that professional people now have is precious. But the one to two hours spent once a month at an EGS meeting can be valuable. Our meetings offers geologists an opportunity to meet with other geologists in a relaxed atmosphere, and potentially to learn something they didn't know before. What can we do to keep the members we have, attract the members we have lost, and reach out to new members?

On that note, I hope to see you all at the last official meeting of the year. Tom Missimer will be speaking on design of ASR systems. Plans are still being made for the EGS picnic in June. I hope you can join us.

Sincerely,
Elizabeth

Speaking to you from SOMEWHERE IN THE MISSISSIPPIAN

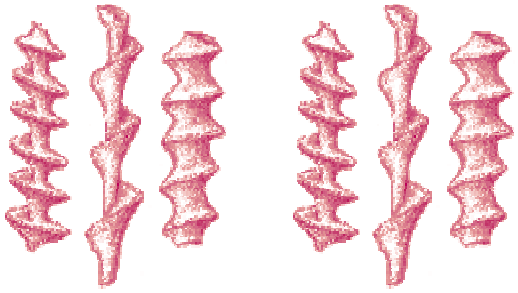
by Rick Shaver May 2001

Some random thoughts on geology….. I was fortunate to live in California early in my life and my parents have many pictures of me at the age of 3 propped up on various granite boulders in Yosemite National Park with the sweeping grandeur of Half Dome and El Capitan as my background. I think my Yosemite experience may have been the seed of interest and excitement about geology planted in my head. Spending two weeks of every summer in Miami introduced me to beach sedimentation, coral reef formation, and fossil identification. A high school earth science class took me to Laurel Caverns on the ridge of the same name in southwestern Pennsylvania. Collecting Mississippian brachiopods and corals on that ridge while looking out on a thousand foot vista and wondering how these marine denizens (so similar to my Miami finds) got to that altitude is my most memorable inspiration to study geology. Let me know what inspired you to study geology.

I KNOW other members have good stories to tell. PLEASE take a couple of minutes to write them down for us for next year. Some possible topics – the most interesting job site you ever worked on, the most unique formation you ever drilled through, the most stupid environmental regulation you ever dealt with… Is anybody really reading this column?

USEPA is starting to push the lead contaminated soils problem – any developments on this in FL?… Some #!&? (US Rep. Richard Pombo, R-Cal.) has introduced HR 1695 calling for an immediate ban on the use of the gasoline additive MTBE. His quote – "The sooner we ban this pollutant, the quicker we protect our children's drinking water." Come on, grow up Mr. Pombo, banning something DOES NOT make the problem disappear! Cleanup costs alone will drive the use of a replacement additive, plus UST regs. have basically fixed this problem already. Would he prefer we go back to lead? OK, I've vented long enough.

I hope to find an Archimedes axis this year.



Everglades Geological Society

Meets on the Third Tuesday of each month at the French Connection Cafe on First St.in downtown Fort Myers, Florida. Social hour starts at 5:00 PM. The meeting begins at 6:00 PM. No meetings are held in July or August

EGS MEETING CALENDAR 2001

January 16
February 20
March 20
April 17
May 15

Join Everglades Geological Society

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