



Alliance

for **s**equestration **t**training, **o**utreach, **r**esearch & **e**ducation

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Goal: To promote the transfer of scientific knowledge and applied engineering technologies related to CO₂ sequestration in the Gulf Coast region.

*Successful implementation of this program will help create a **skilled workforce** for the CCS industry and foster the **public understanding** required to advance the United States in its energy security and its leadership position with regard to climate change mitigation technology.*

Where?

Considering the Gulf Coast states, we chose three of the top ten CO₂ emitters in the country.

- **Texas**
- **Florida**
- **Louisiana**

How?

We will focus our efforts on four primary areas.

- **Sequestration Workforce Training**
- **Research and Technology Dissemination**
- **Workforce Pipeline Education**
- **Public Outreach**

Sequestration Workforce Training

Train scientists and engineers (employed and unemployed) who would be candidates for the emerging sequestration workforce.

Strategy:

Create alliances with various local partners who will:

- (1) sponsor our training at no or low cost to our target audience
- (2) handle logistics of training
- (3) advertise and assist in recruiting our target audience

...a few examples



GCAGS
Gulf Coast Association of
Geological Societies

Gulf Coast Association of Geological Societies

60th Annual Convention

San Antonio, Texas

October 10-12, 2010



**2-day sequestration
workshop before the
meeting**





Florida Association of Professional Geologists



American Institute of Professional Geologists (AIPG)

Continuing Education interest in Miami, Orlando, Gainesville and Tallahassee

Summer 2009 Newsletter

FAPG Florida Association of Professional Geologists

CALENDAR EVENTS

September 1, 2009
FAPG/AIPG Executive Committee Planning Meeting, Orlando, FL
Contact Jamie Hirsch for details:
352-372-1500

October 3-7, 2009
AIPG Annual Geology and Resources Conference, Grand Junction, Colorado
<http://www.aipg.org/>

April 28 - May 6, 2010
The Second Annual FAPG/AIPG Conference: Emerging Issues in Water Resources in Florida and the Southeast Region
(Location To Be Announced)

September 2010
AIPG Annual Geology and Resources Conference, Tallahassee, Florida
(Location To Be Announced)

Message from the President: No Time to Rest!
James D. Hirsch, P.G., FAPG/AIPG President

I am honored to be serving as the new president of the Florida Association of Professional Geologist (FAPG), the Florida Section of the American Institute of Professional Geology (AIPG). Our past president, Charles Drake, completed his very busy and successful term as president by leading our first ever FAPG/AIPG Annual Conference in St. Augustine, Florida. The conference was titled Emerging Issues in Water Resources in Florida and the Southeast Region. For those of you who were able to attend the conference, I have no doubt that you were as impressed as I was with the list of speakers and presentation topics, and the venue. Let's all give a big thank you to the folks who attended, participated, and sponsored the conference. Without your support, this first time conference could not have been the success that it was. Let's also give Chuck Drake a big thank you for his service to FAPG/AIPG. Chuck, like his predecessors, worked very hard for the organization, not for the perks, but for their love of the geology profession. Thank you, Chuck!

The activity level for FAPG for the remainder of 2009 and 2010 looks like it will continue to be very high. We are planning to hold regional FAPG/AIPG meetings throughout the state in 2009-2010. Regional meetings are a great opportunity to network with local colleagues, keep up to date on FAPG/AIPG issues, and learn how to become more active in the organization.
(Message from the President continued on Page 4):

2009-2010 FAPG/AIPG Officer Election Results

The new officers for 2009-2010 were announced at the Annual Meeting in St. Augustine on April 30, 2009. In accordance with current FAPG/AIPG bylaws, the term for each Executive Committee member is one year. The track for President-Elect includes one year as President-Elect, one year as President, and one year as past president. The new elected FAPG/AIPG officers are:

President - James (Jamie) Hirsch, P.G.
President-Elect - Joe Fuku, P.G.
Secretary - Darrin Harrell, P.G.
Treasurer - Kenneth Wallis, P.G.

events. **Jamie Hirsch**, FAPG/AIPG President, will be attending on behalf of the Florida section. Sessions will include a full day and two half days with field trips in the afternoon. There will be additional full and half-day field trips throughout the meeting. For more information, visit http://www.aipg.org/2009/G1_home.htm

POTENTIAL TRAINING OPPORTUNITY - CARBON CAPTURE AND SEQUESTRATION

The Bureau of Economic Geology, the Petroleum and Geosystems Engineering Dept, and the Institute for Geophysics at The University of Texas at Austin have submitted a proposal to the Dept. of Energy for stimulus funding to provide Regional Carbon Capture and Sequestration (CCS) Technology Training. The purpose of the funding is to train professionals in this emerging technology so that as the industry develops, there is a viable workforce available. The proposal addresses current people in the workforce as well as university students soon to



Alliance Partners in Louisiana

Lafayette Geological Society



New Orleans Geological Society



Delta Section (New Orleans) Society of Petroleum Engineers



Topics?

We will focus on select topics matched with our researcher/technologist/professor specialties and experience.

- Project Development
- Resources Assessment (O&G, water)
- Site Characterization, Subsurface Geology
- Permitting
- Well Drilling and Completion for CO₂
- Reservoir Engineering, EOR-CO₂
- CO₂ Injection
- CO₂ Monitoring, Petrophysics,
- Geophysics
- Geochemical Impacts
- Geomechanical Impacts
- Project/Risk Assessment



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Research and Technology Dissemination

Propagate understanding of the latest research results and technological advances in the area of carbon sequestration, including work by the RCSPs and other independent research entities, specifically in Texas, Louisiana and Florida.

Strategy:

Transfer research and technology through the following vehicles:

- (1) website and info hub
- (2) e-newsletter, tech alerts
- (3) training courses

STORE
sequestration training, outreach, research & education

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About STORE

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By many estimates, America has more than a 200 year supply of coal. America can continue to make great progress in improving environmental quality while at the same time enjoying the benefits of using domestic energy resources like coal to meet our growing demand for affordable, reliable and clean energy."

This well-crafted vision, balancing our nation's energy needs with our stance on controlling greenhouse gases, necessitates the promotion of carbon capture and storage (CCS) throughout the country, particularly in the Gulf Coast states, which include three of the top ten CO2 emitters in the country, namely, Texas (41), Florida (46) and Louisiana (41)."

The overall goal of this project is to facilitate the mitigation of global climate change by promoting the transfer of scientific knowledge and applied engineering technologies related to CO2 sequestration in the Gulf Coast region. Successful implementation of this program will help create a skilled workforce for the CCS industry and foster the public understanding required to advance the United States in its energy security and its leadership position with regard to climate change mitigation technology.

Effective transfer of knowledge and technology to the workforce will yield reduced costs, improved industry efficiency, increased CO2 storage, accelerated implementation of CO2 projects, enhanced environmental compliance and optimized basin characterization efforts for the nascent CCS industry.

Our strategy to promote knowledge and technology transfer is to create an Alliance for Sequestration Training, Outreach, Research and Education (STORE) housed at the Gulf Coast Carbon Center at The University of Texas at Austin. During the first three years of the program (i.e., the funding period), we will focus on four primary objectives aligned with the needs of the emerging CCS industry in Texas, Louisiana and Florida:

- (1) **Sequestration Workforce Training**
- (2) **Public Outreach**
- (3) **Research and Technology Dissemination**
- (4) **Workforce Pipeline Education**

With these four objectives as its highest priorities, the proposed STORE Alliance will leverage its personnel, partners and resources to accelerate the transfer of scientific knowledge and applied engineering technologies to create both a skilled workforce for and better public awareness of the emerging CO2 sequestration industry and technology in America.

* The national energy news site is a page of America's Energy Information page operated by the American Carbon Capture & Storage Industry Consortium on 12 Jul 2009. <http://www.americanenergy.org/Default.aspx>

** Statistics are based on 2002 numbers from Office of Environmental Quality Agency, Energy CO2 Emissions by State Data Release on 12 Jul 2002. <http://www.epa.gov/energy/energy-emissions-co2-emissions-by-state>

*** <http://www.epa.gov/energy/energy-emissions-co2-emissions-by-state> states that the largest emitting states for CO2 emissions in both Texas and Florida is electric power.

carbon sequestration - Bing News Updated :
CO2's Carbon Sequestration... An Energy Department-sponsored carbon dioxide sequestration project in Miss...
Publ.Date : Thu, 05 Nov 2009 23:29:00 GMT

Is it too late to go to...
IETM involved in an ongoing email debate over the wisdom of...
Publ.Date : Sat, 14 Nov 2009 01:08:00 GMT

Setting the house on fire...
Addressing a scattering of foreign delegates amidst a sea of empty seats...
Publ.Date : Wed, 12 Nov 2009 05:01:00 GMT

Is it too late to go...
By David Roberts IETM involved in an ongoing email debate over the wisdom...
Publ.Date : Fri, 13 Nov 2009 13:54:00 GMT

Sequestration capacity...
There are two types of carbon sequestration, first, there is terrestrial...
Publ.Date : Tue, 10 Nov 2009 04:12:00 GMT

RSS to HTML
Web Site Traffic

Workforce Pipeline Education

Bring CO2 sequestration training to universities and colleges.

Provide professional development training for teachers who could broaden their students' work vision to include CSS industry.

Strategy:

Network with the following groups to heighten awareness of CSS technology and industry:

(1) universities and colleges (LA e.g., University of LA Lafayette, Tulane

(2) teacher professional development networks



TXESS Revolution

The **TeX**as **E**arth and **S**pace **S**cience **R**evolution

Join the...



...and lead the nation.

Sponsored by NSF's Opportunities for Enhancing Diversity in the Geosciences (OEDG) program, with additional support from the Jackson School of Geosciences and the Texas Regional Collaboratives



***TXESS* Revolution**

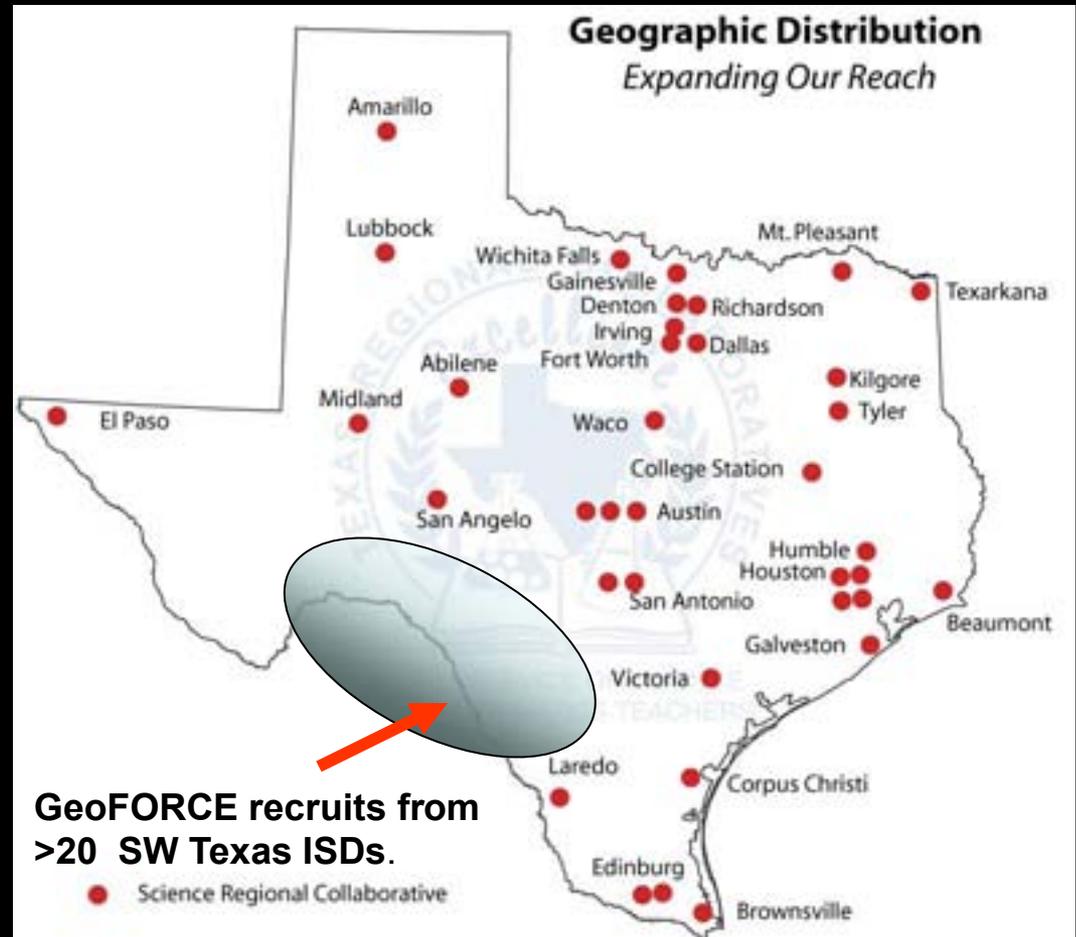
- **Texas State Board of Education: require 4th year of science - graduating class of 2011; and Earth and Space Science capstone as an option for 4th year of science**
- **Provide rigorous preparation for high school teachers for the Texas Earth and Space Science course**

GeoFORCE Texas

Elite programs to expose SW Texas 8-12th grade students to geology and careers in the geosciences.



TRC www.thetrc.org



**The Texas Regional Collaboratives
for Excellence in Science and
Mathematics Teaching**

Science and Technology Institute 2009

focus: Energy



Science and Technology Institute 2009

focus: Energy



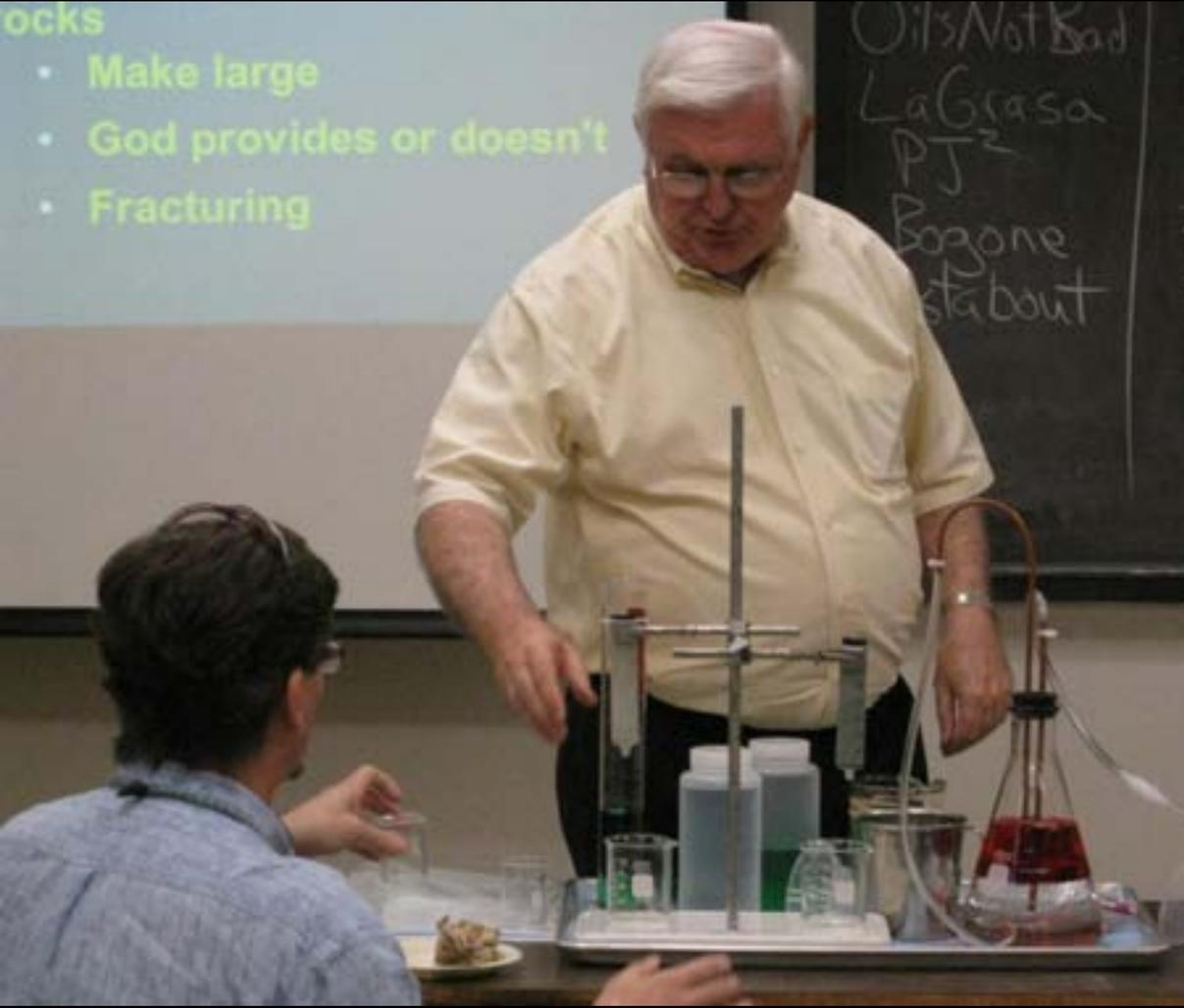
Science and Technology Institute 2009

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Science and Technology Institute 2009

focus: Energy



Problem 1: Physical Properties of CO₂ Relevant to Geologic Storage

The Lower Colorado River Authority (LCRA) operates the Fayette Co. Power Project, a coal-fired electricity generating plant. Suppose you are commissioned by the LCRA to conduct a feasibility study of storing CO₂ emissions from this plant as close to the plant as possible.



The lower Wilcox is a large aquifer running in parallel with the Gulf Coast that extends through Fayette County. See diagrams, maps, and logs in accompanying slides e.g. <http://www.twdb.state.tx.us/publications/reports/GroundWaterReports/GWRReports/R56/Figures/Figure14b.pdf>

(1) Find the **temperature and pressure in the section called the "G-2 unit"**. Assume typical hydrostatic gradient (10 MPa/km) and typical geothermal gradient (25 C/km) and a surface temperature of 15 C. Use the density charts in the notes. You may also wish to visit <http://lnx.lbl.gov/gaseos/gaseos.html>.

(2) Find the **density of CO₂ at this T and P .**

(3) Find the **viscosity of CO₂ at this T and P .**

(4) Assume the water in the lower Wilcox at this depth has salinity 20,000 ppm. What would be the **concentration of CO₂** dissolved in the aquifer brine?

Science and Technology Institute 2009

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The Great Multiplier in Teacher Outreach and Mentoring...*a little math*

We are working with 170 teachers during the program

Each teacher gives outreach to 25 teachers on average

$$170 \times 25 = \mathbf{4,250 \text{ teachers}}$$

Those 4,420 teachers reach on average 70 students per year

$$4,420 \times 70 = \mathbf{309,400}$$

Actual Results from first Cohort of Teachers (2007-2009):

1,356 teachers served through project-based outreach by 35 teachers (on average reaching 38 teachers each – above the expectation of 25 teachers).

Outreach

Increase public awareness of energy issues and CSS technologies, specifically issues of Monitoring/Verification/Accounting and the permanence of storage.

Strategy:

Leverage relationships, specifically those established through teachers in local areas for public outreach events:

(1) *French Family Science, Math and Technology Center* Open House Event –Dallas (fall, 2010)



(2) Rio Grande Valley Science Association (open house events, conferences, summer camps)



Science and Technology Institute 2009

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(Schlumberger Information Solutions Visit)

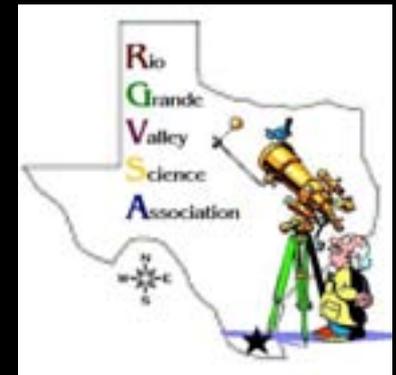


Engaging Girls in Science Camp 2009



Schlumberger

Rio Grande Valley
South Texas



In closing, we would be happy to collaborate with any of you in our four areas of work:

- Sequestration Workforce Training**
- Research and Technology Dissemination**
- Workforce Pipeline Education**
- Public Outreach**



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