

Annual Report 2009



LSU Center for Energy Studies



Introduction

The Center for Energy Studies will have to confront and adjust to two “game-changing” facts in the coming year. The first is the projected reduction in the University’s budget. The second is the repercussions from the blowout of BP’s Macondo deepwater well in the Gulf of Mexico.

The University’s, and the Center’s, budget grew significantly during the first eight years of the past decade. That growth stalled two years ago as the decline in economic activity now commonly referred to as the “Great Recession” began to depress the state’s economic activity, and its revenues fell. Coincidentally, the legislature enacted changes in the state’s tax structure that reduced its revenues further. The revenue shortfall has required LSU and other state agencies to make repeated cuts in operating budgets. The shortfall will grow as federal expenditures to support programs enacted to stimulate the economy and end the Great Recession, begin to expire during the next fiscal year. Few predict either economic activity or the state’s tax structure to change in ways that will return the state’s or LSU’s budget to their pre-recession growth path.



The Macondo blowout affects the state’s economy and revenues in numerous ways. In the immediate term, economic activity in the commercial and recreational fishing, seafood, and tourism industries have been depressed. Although BP’s compensation payments for economic losses, as well as environmental damages, have had a positive economic impact, the net economic effect of the blowout as a whole undoubtedly has been negative. Potential negatives associated with the proposed moratorium on all deepwater drilling, at the time of this writing, are still unresolved, but they may be much more serious over the longer term. Deepwater oil and gas exploration and production are very capital intensive activities. Both the physical and human capital that has been created is not only expensive but much of it is mobile as well. An extended moratorium will encourage a migration of capital out of the Gulf of Mexico.

The advantage of the Gulf of Mexico compared to other oil and gas producing areas is primarily a stable and predictable legal and regulatory structure. An extended moratorium also will increase fears of further restrictions and moratoria on deepwater activity. Currently there are about 3,500 active leases in the Gulf in water deeper than 1000 feet and about 1,600 approved applications to drill. There are fewer than 40 rigs now in the process of drilling at that depth with somewhere between 20,000 to 30,000 jobs either directly or closely associated with that activity. Both the cost of suspending current drilling and the risk of losing the potential to generate future economic activity inherent in those data are significant factors in Louisiana’s future.

The challenges these two new realities have created for the Center and its associated units are real and will require changes in our objectives and operations. However these challenges are central to our mission and, as the following report illustrates, also are aligned quite closely with our institutional capabilities and experience. We are proud of our past accomplishments and confident that we will be able to adjust and continue to contribute to the state and University in the future.

A handwritten signature in black ink that reads "Allan Fulsipher". The signature is fluid and cursive.

Executive Director
Center for Energy Studies
Louisiana State University

Center for Energy Studies

www.enrg.lsu.edu

Allan G. Pulsipher · Executive Director

Energy Research Focuses on Louisiana's Coast and Environment

Center for Energy Studies faculty and research associates were involved in more than 20 ongoing projects during 2009. Projects addressed economic, social, and environmental issues related to the energy and petrochemical industries along the Gulf Coast, including the estimation of offshore oil and gas reserves lost due to the 2008 Gulf of Mexico hurricanes; compilation of a state greenhouse gas inventory to prepare Louisiana industry for possible new federal environmental regulation; assessment of the hydrocarbon-generating potential of the Bossier-Haynesville shale gas play; economic, environmental, and regulatory perspectives on marginal hydrocarbon production in the Gulf of Mexico and lost production from early decommissioning; and identification of geographic areas along the Gulf Coast most relevant for socioeconomic impact analysis.

Funding agencies included the Louisiana Workforce Commission, the Louisiana Department of Natural Resources, the Petroleum Technology Transfer Council, and the Minerals Management Service, U.S. Department of the Interior.

CES research projects for 2009 included the following, some of which are ongoing:

Preparing Louisiana for the Possible Federal Regulation of Greenhouse Gases. Mike McDaniel. Funded by the Louisiana Department of Economic Development. The purpose of this project is to help prepare Louisiana for the possible federal regulation of greenhouse gases (GHG) to assure that the state's economic competitiveness is not compromised and that economic development opportunities are recognized. A comprehensive state-wide GHG inventory was developed and is available online at www.enrg.lsu.edu. The second element of the project, a thorough review of measures being taken or contemplated by other states to accommodate expected federal GHG regulation or climate change concerns, is also available. The third project element will be a high-level assessment of the impacts of the most likely federal GHG regulatory schemes on Louisiana's economy. The fourth will be a list of potential state and industry strategies for responding to requirements and opportunities brought by federal GHG regulation.

In 2009, CES energy research projects brought in more than \$3 million in federal and more than \$140,000 in state research funds.

Geographic Units for Socioeconomic Impact Analysis in the Gulf of Mexico Region.

Allan Pulsipher and Kathy Perry. Funded by the U.S. Department of the Interior, Minerals Management Service. This study will use industrial cluster analysis, regional input/output analysis and modeling, and geographic information systems in an interdisciplinary effort to identify geographic areas where significant socioeconomic impacts from offshore oil and gas development, either negative or positive, are likely to occur. The study is designed as an interactive and iterative exercise involving an interdisciplinary research team from LSU and MMS staff. The objective is to delineate Economic Impact Areas (EIAs) in the Gulf of Mexico (GOM) states that are based on a clear, explicit, empirical rationale, reflective of the onshore effects of the offshore industry, and able to more clearly guide and support social impact assessments of industry operations and activities. Reaching this objective will facilitate better compliance with the goals of the National Environmental Policy Act (NEPA).

Post Hurricane Assessment of OCS-Related Infrastructure and Communities in the Gulf of Mexico Region.

David Dismukes and Allan Pulsipher. Funded by the U.S. Department of the Interior, Minerals Management Service and the LSU Coastal Marine Institute. An earlier study sponsored by MMS surveyed a wide range of existing onshore infrastructure supporting offshore activities. This investigation resulted in several products including: (1) a GOM "Infrastructure Factbook;" (2) a database of locational and facility attributes of this supporting onshore infrastructure; and (3) a GIS product that maps onshore infrastructure locations across the Gulf. This project will update the information from the earlier study, so that the most current, up-to-date information about OCS-related infrastructure in the region will be available for federal and state decision-makers. A draft final report is beginning the editorial process.

The Benefits of Continued and Expanded Investments in the Port of Venice.

David Dismukes, Christopher Peters, and Kathryn Perry. Funded by the Port of Venice Coalition. The project evaluates the impact of investment in the Port of Venice on Louisiana's offshore oil and gas industry. The Port of Venice is a multi-purpose facility that services the offshore oil and gas industry in both federal and state waters. The port is also home to a large number of commercial and recreational fishing vessels. The CES economic impact analysis of the port was based upon a detailed tenant and port user survey that incorporated economic impact models and analyses, as well as sophisticated satellite tracking measurements to examine vessel movements into, out of, and through the port to state and federal drilling and production locations. The study estimated that the port will have made more than \$117 million and \$188 million in capital investments in 2008 and 2009, respectively. These capital investments, comprised of infrastructure improvements and marine vessel expenditures, will lead to more than 1,070 jobs for the local economy and neighboring Louisiana parishes.

For a complete list of ongoing CES projects, visit www.enrg.lsu.edu/view/projects.

Energy Research Available to Public at CES Library, Online

The CES library provides access to energy information to CES researchers, the University, and the public sector through reference services and a specialized book collection. The library houses the supporting documents for the Center's statistical databases, purchases and routes books, journals, and newsletters for the department, and provides a contact point for rotunda reservations.

Special projects, such as the "Comprehensive History of the Offshore Oil and Gas Industry in Louisiana and its Consequences," can be accessed by the public in their entirety. Library hours are 8 a.m. to 4:30 p.m., Monday through Friday.

In 2009, the Louisiana Energy Indicators database was upgraded from a series of in-house Quattro Pro spreadsheets to a query-based system accessible via the CES webpage. The effort was initiated years ago by CES librarian Barbara Kavanaugh, who foresaw the convenience of the Internet to make the CES energy data available to as many people as possible through a user-friendly system. Louisiana energy data can be accessed by clicking "Energy Data" on the CES homepage: www.enrg.lsu.edu.

Timely Energy Topics Focus of Conferences, Meetings

To carry out the Center's mission of educating Louisiana's citizens on pertinent energy issues in 2009, CES faculty and staff performed energy analyses at the request of public agencies, hosted conferences addressing timely energy issues, coordinated workshops for technology transfer, and presented their works at public and professional meetings.

2009 Conferences and Symposiums

The Center's outreach and education efforts included full-day conferences—the annual Alternative Energy Conference and Energy Summit 2009, and the first Oil & Gas Symposium—addressing U.S. energy independence, developments in renewable energy, and Louisiana oil and gas industry regulations and requirements. These events attracted an average of 100 paying participants from industry, state agencies, academia, and the general public. The Center hosted a climate change forum with the Louisiana Association of Business and Industry, the United States Chamber of Commerce, and the Louisiana Oil & Gas Association, and held an energy efficiency workshop cosponsored by the Pew Center on Global Climate Change, Entergy, and America's WETLAND.

Emerging energy policy issues and technological developments are often treated at CES conferences one to two years in advance of their discussion in trade journals and the general media. Conference agendas are available online at www.enrg.lsu.edu/conferences.



Energy Summit 2009 speakers George Given, head of global power research for Wood MacKenzie (far left), and Sara Banaszak, senior economist with the American Petroleum Institute (second from right), meet with Chris D'Ella, dean of the School of the Coast and Environment (second from left), and CES's David Dismukes during a break in the October conference.

CES hosted conferences and symposiums throughout the year addressing current energy topics affecting the state and region, including

- Louisiana oil and gas industry regulations and requirements;
- Oil and gas exploration and production technology;
- U.S. energy independence;
- Developments in renewable energy;
- Environmental issues affecting La.'s petrochemical industries;
- Energy efficiency.



In October, the Center co-hosted the E. J. Ourso College of Business's Supply Chain Management Symposium in conjunction with the annual Energy Summit.

2009 Calendar of CES/LGS Public Outreach Events

The Center for Energy Studies and Louisiana Geological Survey hosted several meetings and events in 2009, including 11 public outreach and educational programs attended by more than 500 people.

March:
 Energy Leadership Speaker Series
 NOAA meeting
 Groundwater Symposium

April:
 Alternative Energy Conference

May:
 Energy Leadership Speaker Series
 Oil & Gas Symposium

June:
 LSU Carbon Offsets meeting

August:
 Energy Workshop

October:
 Energy Summit
 Supply Chain Management Symposium

November:
 Pew Center on Global Climate Change/Entergy Make an Impact event

The Center for Energy Studies is grateful to the following companies and agencies for providing continued support of our events through conference sponsorship:

- American Electric Power**
- Chevron**
- ConocoPhillips**
- The Dow Chemical Company**
- ExxonMobil**
- F. Malcolm Hood & Associates**
- Kean, Miller, Hawthorne, D'Armond, McCowan & Jarman, LLP**
- Louisiana Department of Economic Development**
- Louisiana Department of Natural Resources**
- Premier Industries**
- Southern Strategy Group**
- Suez Energy**

Conference Center Venue for More than 200 Events in 2009



LSU student environmental organizations participated in Entergy's Make an Impact event in November.

The Dalton J. Woods Auditorium, rotunda conference room, and lobby area saw heavy traffic again last year, serving as the venues for 239 events hosted by both on-campus and off-campus groups. Events included meetings of campus groups and committees, faculty and student organizations, graduate seminars, distinguished speakers, graduation ceremonies, and film series.

Haynesville Shale Focus of Technology Transfer in '09

The Center for Energy Studies is home to the Petroleum Technology Transfer Council (PTTC) Gulf Coast Region, funded by the American Society of Petroleum Geologists. In FY 2008-2009, the PTTC, under the direction of Professor Don Goddard (now retired), conducted workshops and presentations on oil and gas exploration and production technology to small, independent producers in Baton Rouge, New Orleans, Lafayette, Shreveport, Jackson, Miss., Dallas, and Fort Worth. Workshops on the geological and geochemical characterization of the Bossier-Haynesville shale gas play in north Louisiana were presented in several cities. Other topics included microbial reservoir play in central and eastern Louisiana and sequence stratigraphy application in salt basins on the Gulf Coast plain.



Energy Leadership Speaker Series Brings LSU Alums to Campus

The Center for Energy Studies hosts a speaker series focusing on careers in the energy industry. Invited speakers are most often LSU alumni who occupy executive positions within their companies. The target audience for the Energy Leadership Speaker Series is LSU undergraduate and graduate students with an interest careers in energy-related fields. In 2009, CES hosted LSU alumni Quinn Hébert, chairman of Cal Dive International, Inc., who discussed Cal Dive's repair efforts in the aftermath of Hurricane Katrina, and Sharon Cole, site director of The Dow Chemical Company's Louisiana Operations, who discussed Dow's role as an economic engine in the state and the company's plan to capitalize on alternative energy in future.



Guest speaker Quinn Hébert, chairman of Cal Dive International, presents David Dismukes with a sculpture of a diver, now on display in the CES library.

Dow Louisiana's Sharon Cole takes questions from the audience at the May 2009 Energy Leadership Speaker Series event.





CES On Location

The Center fulfills its public education mission, in part, by having its researchers respond to requests for speaking engagements. Last year, CES faculty gave more than 25 presentations to organizations including the Minerals Management Service, the National Association for Business Economics, the Louisiana Public Service Commission, the Louisiana Chemical Association, the U.S. Association for Energy Economics, and the American Petroleum Institute Southern Region.

January

Background, issues, and trends in underground hydrocarbon storage. David E. Dismukes. Environmental Permitting Class, 29 January.

February

Understanding petroleum fiscal system issues and concerns for stakeholders in petroleum producing regions. Wumi Iledare. Upstream Petroleum Economics Seminar organized by Universal Network Intelligence, Kuala Lumpur, Malaysia, 25-27 February 25-27.

Gulf coast energy outlook. David E. Dismukes. Lakeshore Lions Club Meeting, 16 February.

March

Alternative energy developments. Mike McDaniel. Louisiana Solid Waste Association, 26 March.

Gulf Coast energy outlook: Issues and trends. David E. Dismukes. ISA-Lafayette Technical Conference & EXPO Cajundome Conference Center, 12 March.

April

An overview of the energy industry along the Gulf of Mexico. David E. Dismukes. Society and the Coast Lecture, 17 April.

May

Potential impacts of cap and trade on Louisiana ratepayers: Preliminary results. David E. Dismukes. Business and Executive Session, Louisiana Public Service Commission, 13 May.

Natural gas outlook. David E. Dismukes. Business and Executive Session, Louisiana Public Service Commission, 13 May.

June

Modeling deepwater petroleum exploration and development efforts and outcomes in the U.S. Gulf of Mexico Region. Wumi Iledare. 32d USAEE/IAEE International Conference, San Francisco, California, 21-24 June.

Mobility management & transportation system modeling. Lauren Stuart. 32d USAEE/IAEE International Conference, San Francisco, California, 21-24 June.



Top: In June, Wumi Iledare discussed the modeling of deepwater petroleum exploration and development efforts in the Gulf of Mexico at the 32nd Annual USAEE/IAEE International Conference in San Francisco, for which he also served as chairman of the Concurrent Session Committee.

Middle: David Dismukes represented the Center at approximately 20 speaking engagements in 2009, discussing timely energy topics including the natural gas outlook for Louisiana, regulatory and ratemaking issues, and carbon and clean energy markets.

Bottom: Several professional and civic organizations invited CES professional-in-residence Mike McDaniel to speak on climate change, cap and trade, potential impacts of greenhouse gas regulation, and developments in Louisiana bioenergy.

July

Prognosis for federal greenhouse gases regulation and its potential impacts on Louisiana. Mike McDaniel. Association of Louisiana Electric Cooperatives Annual Membership Meeting, 27 July.

Evolving carbon and clean energy markets. David E. Dismukes. Briefing for Jones Walker law firm, 23 July.

August

Climate change/cap & trade. Mike McDaniel. Rayne, La., Chamber of Commerce, 27 August.

Carbon legislation and clean energy markets: Policy and impacts. David E. Dismukes. National Association of Conservation Districts. South Central Region Meeting, 14 August.

Louisiana's bioenergy resources. Mike McDaniel. Rep. Bill Cassidy's Green Energy Summit, Baton Rouge, 13 August.

September

Renewable and alternative energy in Louisiana. David E. Dismukes. 2009 Louisiana Oil and Gas: From SONRIS to Sunset, New Orleans, 22 September.

Gulf Coast energy outlook: Issues and trends. David E. Dismukes. Natchez Area Association of Energy Service Companies, 15 September.

October

Worldwide deepwater petroleum exploration and development prospectivity: Comparative analysis of efforts and outcomes. Wumi Iledare. SPE Annual Technical Conference and Exhibition, New Orleans, 4-7 October 4-7.

Funding opportunities for natural gas vehicles. Mike McDaniel. Louisiana Gas Association, 14 October.

Fleet management and alternative fuels. Mike McDaniel. Louisiana Chapter American Public Works Association, 30 October.

Louisiana's stakes in the greenhouse gas debate. The billion-dollar budget crisis: Catastrophe or change? David E. Dismukes. LCA/LCIA Annual Meeting, 22 October.

November

Global petroleum supply and pricing: Where is the beef? Wumi Iledare. Presentation at the Louisiana Department of Natural Resources, Baton Rouge, 17 November.

Louisiana's bioenergy future. Mike McDaniel. Louisiana Tech University Energy Systems Conference, 5 November.

Regulatory and ratemaking issues associated with cost and revenue tracker mechanisms. David E. Dismukes. National Association of State Utility Consumer Advocates, 15 November.

Potential impacts of federal greenhouse gas legislation on Louisiana industry. David E. Dismukes. LCA Government Affairs Committee Meeting, 10 November.

December

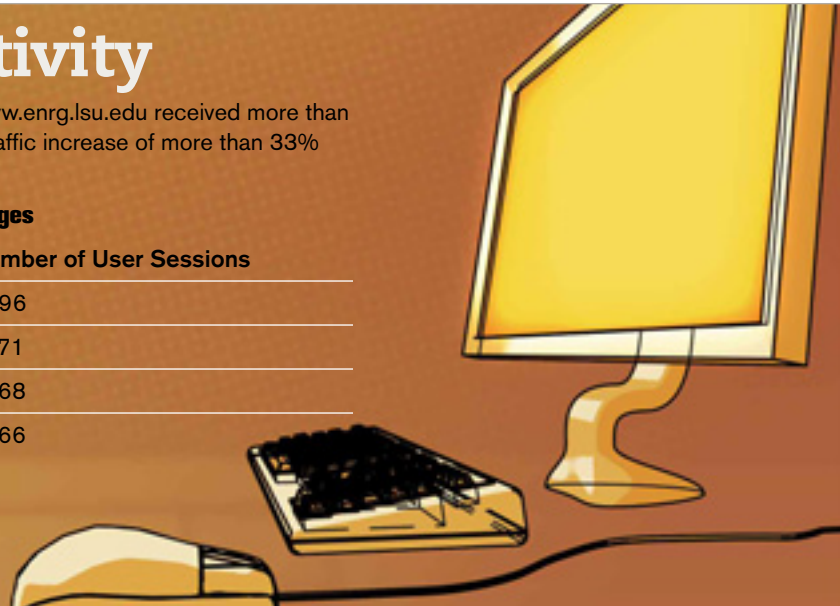
Update on climate change legislation. Mike McDaniel. AgCenter ACE (Agriculture Communications in Education) meeting, 16 December.

Web Activity

The CES home page www.engr.lsu.edu received more than 17,000 hits last year, a traffic increase of more than 33% from 2008.

Most popular CES webpages

Page	Number of User Sessions
Staff	3896
Conferences	3071
Publications	2968
Projects	2566



CES in the News

CES faculty respond frequently to media requests from local, regional, and national news agencies. During the past year, faculty members shared energy expertise with

- the *Mississippi Business Journal*,
- *Raleigh News Observer*,
- the *Orlando Sentinel*,
- the *Tampa Tribune*,
- the *Nashville Tennessean*,
- the *Knoxville News Sentinel*,
- the *Chattanooga Times Free Press*,
- the *Greater Baton Rouge Business Report*,
- the *New Orleans Times-Picayune*,
- the *Baton Rouge Advocate*,
- *New Orleans CityBusiness*,
- WWL News Radio,
- WRKF Radio.

Brooksher, Hood Scholarships Awarded

The Robert R. Brooksher /LMOGA Scholarship and the first F. Malcolm Hood Scholarship were awarded to three students in the fall. Awarded the \$500 Brooksher scholarship were senior geology major Jesse Landreneau from New Orleans (a two-time recipient), and petroleum engineering majors Alaina Johnson and Allison Kuykendall. The scholarship is named for the late Robert R. Brooksher, Jr., who was executive vice president of Louisiana Mid-Continent Oil and Gas Association and a founding member of the LSU Center for Energy Studies' Advisory Council.

The first F. Malcolm Hood Scholarship, a \$400 award named for the long-time supporter of the LSU Center for Energy Studies, was awarded to Peyton Tippet, a junior petroleum engineering major from Bossier City, La. The Hood scholarship was created to honor the late F. Malcolm Hood, a highly regarded energy industry spokesman who served as an advisor when the Center was created and was a member of its Advisory Council.

Both scholarships are awarded to deserving students in energy-related fields of study and are intended to be applied toward the purchase of books.

CES Personnel

Faculty

Allan G. Pulsipher, Ph.D., executive director and Marathon Oil Company Professor of Energy Policy in the Center for Energy Studies and a professor in the Department of Environmental Sciences at LSU.

David E. Dismukes, Ph.D., associate executive director, director of the Policy Analysis Division, and professor.

Omowumi (Wumi) Iledare, Ph.D., director of the Energy Information and Data Division, professor of petroleum economics and policy research, adjunct professor of petroleum economics at the Craft & Hawkins Department of Petroleum Engineering at LSU and the University of Ibadan.

Mark J. Kaiser, Ph.D., director of the Research & Development Division and professor.

Mike McDaniel, Ph.D., professional-in-residence and an adjunct professor of environmental sciences in the School of the Coast and Environment.

Ralph W. Pike, Ph.D., director of the Minerals Processing Research Division and Paul M. Horton Professor of Chemical Engineering.

Research Associates

Elizabeth Dieterich

Jordan Gilmore

Siddhartha Narra, Ph.D.

Kathryn Perry

Christopher Peters

Ric Pincomb

Brian Snyder

Lauren Lee Stuart

Yunke Yu

Staff

Ann Lewis, word processor operator specialist.

Marybeth Pinsonneault, communications manager.

Stacy Retherford, computer analyst.

Diana Reynolds, assistant to the executive director.

Versa Stickle, librarian.

Michael Surman, computer analyst.



Minerals Processing Research Division

Minerals Processing Research Addresses Biomass, Carbon Capture, Cogeneration

A division within the Center for Energy Studies, the Minerals Processing Research Division (MPRD), directed by Ralph Pike, continues active research projects on the following topics, with the chemical industry's cooperation:

Chemicals from Biomass. Debalina Sengupta, Ph.D. student in chemical engineering, Ralph W Pike and F. Carl Knopf from MPRD, Kerry M. Dooley from chemical engineering and Thomas A. Hertwig with Mosaic Corporation. The vision of the chemicals to biomass program is the development of new industries in the region that are based on renewable resources which supply products of the current industries. This program includes transitioning existing plants that now require nonrenewable resources to ones using biomass feedstocks. The chemical complexes in the Gulf Coast are uniquely positioned to take advantage of bio-derived feedstocks. There is strong agricultural industry in the region, and the Mississippi River provides access to the Midwest and deep ports to ensure continuous supplies of bio-feedstocks throughout the year. The project involves a White Paper titled "Integrating Biomass Feedstocks into Chemical Production Complexes using New and Existing Processes" which gives a detailed description of the conversion of biomass and biofuels to chemicals. It is available on the Minerals Processing Research Division's web site, www.mpri.lsu.edu.

Carbon Dioxide Capture from Power Plants. F. Carl Knopf and Ralph W Pike from MPRD and Jeannine Elliott and Robert Copeland of TDA Research, Inc, in Denver Colorado. Currently, coal-fired power plants generate about one-half of the electricity in the United States. The DOE/EIA estimates that more than 90% of the carbon dioxide emissions from 2007 to 2030 will come from today's existing plants. Plants operating optimally with carbon capture processes could achieve the DOE goal of a 90% reduction in emissions by the year 2020. This DOE-funded project evaluates fixed, fluidized and moving bed reactor designs to capture carbon dioxide emissions with a minimum cost of carbon dioxide mitigated. Part of the research evaluates modifications to existing pulverized coal-fired power plants, specifically American Electric Power's Conesville Unit No. 5.

Integrating a Cogeneration Facility into Engineering Education. LSU faculty from the Minerals Processing Research Division, Chemical Engineering and Mechanical Engineering - F. Carl Knopf, Kerry M. Dooley; LSU Facility Services – Joe Kelley, Peter Davidson; and consultant Louis J. Braquet. Partner universities including Tulane University and Florida State University are utilizing LSU provided data and materials. Cogeneration is a topic of increasing importance to the economic viability of many industries. The government appreciates this need, and it has issued a "CHP Challenge" which has the goal of doubling the amount of cogenerated power in the U.S. by 2020. This goal necessitates capital investments exceeding \$10 billion/yr. There is also the potential for substantial dollar savings in existing CHP systems through optimal energy management schemes. As part of an NSF funded project - Integrating a Cogeneration Facility into Engineering Education, we are integrating into Chemical and Mechanical Engineering curricula the study of energy production and management with the analysis of real-time data from the 20 MW cogeneration system at LSU. Making such data web-available will allow sophomore-year students to perform industrial material and energy balance calculations on major unit operations including gas and steam turbines, air conditioning systems, cooling towers, and boilers. For junior-year students, advanced process modeling is exploring, for example, energy recovery in a heat recovery steam generator. Vertical integration of such individual operations are allowing senior students to explore global issues in energy production and



management, including the optimization of utility costs and the analysis of process dynamics associated with process upsets and highly variable loads, and the resulting optimal control strategies.

A New High Value-Added Product for the Chemical Industry - Carbon Nanotubes. Adedeji Agboola, M.S. student in chemical engineering, Ralph W. Pike, and Thomas A. Hertwig with Mosaic Corporation. Conceptual designs of two industrial scale processes showed the feasibility of producing carbon nanotubes in plants that can be integrated into the Gulf Coast chemical production complex. Results are in collaboration with Mosaic. Research is continuing to have an economically and environmentally optimal design.

MPRD Offers Courses for Professional Engineers

The Division maintains an extensive website, www.mpri.lsu.edu, which provides continuing professional development self-study courses for professional engineers' PDH requirements. Also available on the website are research results including journal articles, conference proceedings, technical reports, theses, dissertations and computer programs. The programs have installation files that can be downloaded and used on an individual's computer. Included with the programs are users' manuals and tutorials. These programs have been developed using actual plants, and the process models can be applied to comparable plants.

Division's Technology Transfer Serves Area Industry

Two technologies that have immediate and substantial energy savings on chemical plants and refineries are "pinch technology" and "on-line optimization." Large companies such as Dow Chemical and Exxon have corporate level groups that routinely apply pinch technology and on-line optimization, but small-to-medium-sized chemical companies in Louisiana do not have the trained personnel needed to apply this technology. With the support of a grant from the Louisiana Department of Natural Resources competitively awarded from PVE funds from DOE, MPRD coordinated short courses on these topics for 38 chemical companies and five process engineering firms. A total of 116 engineers from these companies learned this technology in nine short courses. This represents 25% of the approximately 150 small-to-medium-sized chemical companies in Louisiana and 17% of the total of approximately 700 chemical engineers in the state. Short courses were provided with the assistance of Entergy, Local Section of the American Institute of Chemical Engineers and Borden Chemicals and Plastics Company.

The courses are available on request by contacting the division at www.mpri.lsu.edu.

MPR Division Personnel

Faculty

Ralph W. Pike, Ph.D., Director, Horton Professor of Chemical Engineering

F. Carl Knopf, Ph. D., Associate Director, Anding Professor of Chemical Engineering

Adjunct Professors

Richard C. Farmer, SECA Incorporated, Carson City, Nevada

Michael J. Richard, Richard Consulting, Raleigh, North Carolina

William L. Waldrop, Quantum Engineering Corp., Knoxville, Tennessee

Bert Wilkins, Computer Ventures, Incorporated, Baton Rouge, Louisiana

Process Engineer

Thomas A. Hertwig, Mosaic Corporation (retired)

Ph.D. Students

Debalina Sengupta and Mohammed Shafi Syed

Louisiana Geological Survey

www.lgs.lsu.edu

Chacko John · Director, State Geologist, Professor-Research

LGS Celebrates 75 Years with Oil & Gas Symposium

The Louisiana Geological Survey (LGS) celebrated its 75th Anniversary with an Oil & Gas Symposium May 19-20, 2009, at the Dalton Woods Auditorium in the Energy, Coast and Environment Building. The co-sponsors of the symposium were the Center for Energy Studies, Baton Rouge Geological Society, Louisiana Oil & Gas Association, and the Petroleum Technology Transfer Council. The symposium featured prominent industry, federal, state and University speakers and dealt with permitting issues in Louisiana's Coastal Zone, shale plays, and water issues related to the Haynesville shale gas field. Seminar proceedings are available on the BRGS website www.brgs-la.org. The history of the LGS is available at www.lgs.lsu.edu.

Research Projects

Geologic Review Continues Mission of Protecting Environment.

Geologic Review, a program created by the Louisiana Geological Survey in 1982 to provide regulatory technical assistance to the Coastal Management Division of the Louisiana Department of Natural Resources (DNR) and to three districts of the U.S. Army Corps of Engineers, continues its successful protection of the environment. Oil and gas permit applications made to these two agencies, which involved environmental impact to wetlands or other environmentally sensitive areas, had their geology, engineering, lease, and site-specific data — and sometimes their economic data — reviewed and evaluated in order to determine if there was a less-damaging feasible alternative available. These alternatives involved such concepts as reducing the size of ring levees and slips, reducing the length of board roads and canals, the use of directional drilling, and the use of alternate and less-damaging access routes which still allowed the well to be drilled while avoiding or minimizing any environmental damage involved. The

DOE Announces Industry-AASG-LGS Partnership Awards for Geothermal Research

The U.S. Department of Energy has announced awards for two geothermal energy research projects totaling \$597,799 to LGS through partnerships. The first award to Louisiana Geothermal, funds a three-year project to demonstrate the feasibility of a geopressured-geothermal power plant in Cameron Parish, Louisiana. The proposed plant could potentially generate enough electricity to power 2,000 to 5,000 homes. The LGS award is \$297,820.

The second award funds the National Geothermal Data System (NGDS), an integrated distributed and searchable data system of state-specific geothermal data, which is expected to drive renewed efforts to identify, assess, and exploit geothermal energy resources in the U.S. A consortium put together by the Association of American State Geologists (AASG) and headed by the Arizona Geological Survey, and which includes 46 state geologic surveys, will participate in populating the data system with relevant geothermal data. LGS funding from this award is \$299,979 over three years.

Chacko John, state geologist and director of LGS, is principal investigator for the project. LGS research associate Brian Harder is the co-principal investigator.

contract for Geologic Review has been extended by the Louisiana Department of Natural Resources (DNR) through 2010-2011.

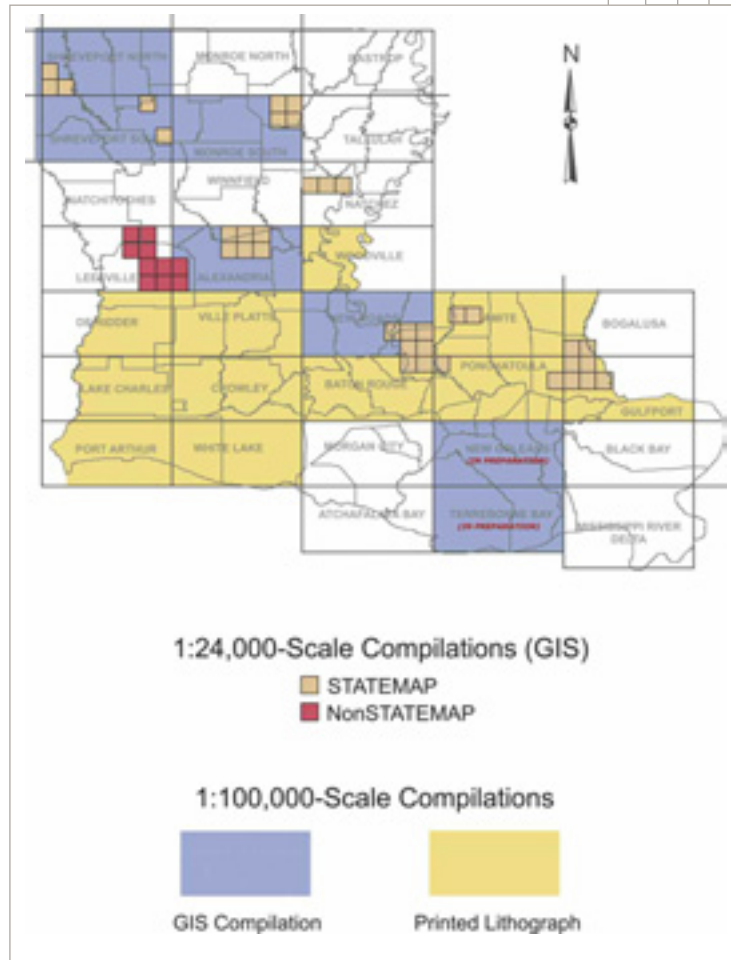
Mapping Louisiana's Surface Geology. The LGS continues to map Louisiana's surface geology as part of the STATEMAP component of the National Cooperative Geologic Mapping Program. Originally begun in the early 1990s, STATEMAP projects are conducted in annual cooperative agreements with the USGS.

Through STATEMAP, the LGS plans to map the surface geology of the entire state at a scale of 1:100,000, which allows for abundant detail while covering relatively large areas. A current STATEMAP project involves mapping the surface geology of a substantial portion of the Mississippi River delta plain in southeastern Louisiana, an area that experienced some of the hurricane strikes. Such detailed geologic maps aid in planning for hurricane protection because they depict aspects of landforms, such as their relative elevations, composition and texture, which correlate with engineering properties and are critical for producing specific derivative maps, for economic development.

Surface geology compilations, upon delivery to the USGS at the end of each STATEMAP project, are open-filed at LGS where copies may be purchased. Links to 1:100,000- and 1:24,000-scale open-file maps from the main publications catalog may be found at www.lgs.lsu.edu. These preliminary drafts are available for reference by members of the public, and to aid in applied research by consultants and other investigators in geotechnical, geoarchaeological and other earth science subdisciplines. Each year the LGS selects one of more 30 X 60 minute geologic quadrangles, compiled in house or with STATEMAP support, for cartographic production to be printed as a lithograph.

USGS Awards Mapping Projects. LGS was awarded the following mapping projects by the USGS in 2009:

- Geologic Mapping of Ashland, Fryeburg, and North Highlands 7.5 Minute Quadrangles, and Recompilation and Digital Production of Shreveport South 30 X 60 Minute Quadrangle, Louisiana; (\$93,065) 1 July 2008 – 30 June 2009.
- Geologic Mapping and Compilation of New Orleans and Terrebonne Bay 30 X 60 Minute Geologic Quadrangles, Louisiana; (\$91,787) 1 July 2009 – 30 June 2010.
- Geologic Mapping and Compilation of Atchafalaya Bay, Monroe North, and Morgan City 30 X 60 Minute Geologic Quadrangles, Louisiana; (\$141,983) 1 July 2010 – 30 June 2011.



Geologic Quadrangle Mapping Status, 1993-Present (Primarily STATEMAP cooperative agreements with USGS.)

Recognition, Characterization, and Analysis of Louisiana Surface Lineaments at Different Scales. Pursued in conjunction with surface geologic mapping and map compilation activities in Louisiana over 20+ years, primarily in cooperative agreements with the U.S. Geological Survey under its COGEOMAP and STATEMAP programs, this effort seeks to identify and analyze widespread yet indirect indicators (primarily manifesting as drainage lineaments) of potential systemic fracturing that has escaped routine perception and documentation. To date it has resulted in the publication of one paper in a peer-review journal (Southeastern Geology) on inferred control of drainage courses in Louisiana by systematic fracture sets that traditionally have remained cryptic in Louisiana.

The National Coal Resource Data System (NCRDS) project is in Year Five of five of the preparation of the Atlas of the Central Louisiana Coal Bed Methane Basin. The basin includes all or portions of Winn, Franklin, LaSalle, Catahoula, Richland, Caldwell, and Grant parishes, and is part of a larger Tertiary Coal Bed Methane Basin, which covers parts of seven southeastern states. Coal bed methane production was first established in the area in 1989 in the Torch #3 Greer well in Caldwell Parish. In the ensuing fifteen years it has become clear that the Big and Russell coal beds of this basin potentially represent significant present and future sources of energy for the United States. The Atlas of the Central Louisiana Coal Bed Methane Basin will serve as a reference work on those resources for the future, showing clearly through maps, illustrations, and cross-sections what the resource is, how much of it there is, and where the resource is located. A new five-year NCRDS proposal (2010-2015) has been submitted to USGS, and funding was recently awarded.

National Geological and Geophysical Data Preservation Program (NGGDPP). LGS is working on a research grant from the NGGDPP program which is coordinated by the USGS for detailed cataloging of cores at the LGS Resource Center and entering the information into a National Data Base being compiled by the USGS.

LGS was represented by Research Associate Patrick O'Neill at a workshop on Geoscience Data Preservation Techniques sponsored by the National Geological and Geophysical Data Preservation Program (NGGDPP) administered by the USGS and the Association of American State Geologists (AASG) and hosted by the Indiana Geological Survey in mid July at Bloomington, Indiana. This two-day workshop was attended by data-preservation specialists from the USGS and State Geological Surveys and served as a forum for providing information and discussion on preservation, cataloging, and data management of geoscience materials at the participating Surveys. For more information of the NGGDPP program, please visit the USGS website at <http://datapreservation-usgs.gov/>.

Geologic Map of the Barberton Greenstone Belt, South Africa. The LGS Cartographic Section is providing technical and cartographic assistance in support of producing and presenting this oversized 55 X 70 inch lithographic wall map of some of the oldest sedimentary rocks in the world. The project is sponsored by the Stanford University Department of Geological and Environmental Sciences and the LSU Department of Geology and Geophysics. This map is scheduled for publication in late 2010.

Regional Groundwater Models. In each of the three long-term projects currently underway, the geology and geohydrology of the aquifer system is being documented and characterized. Scientific data is being gathered from the Louisiana Department of Transportation and Development, the Louisiana Department of Natural Resources, the Louisiana Department of Environmental Quality, the USGS, the Mississippi DEQ, and other private/corporate sources. A conceptual model of the hydrogeologic setting will be calibrated, tested under a variety of scenarios, and a sensitivity analysis performed. The USGS finite difference modeling program MODFLOW will culminate into a groundwater management tool for water planner in the subject parishes. Contacts

have been made with interested parties to fund each project and the prospects for funding are encouraging.

The following long-term regional groundwater projects are currently underway:

- **Mississippi River Alluvial Aquifer System:** The focus area for this project includes ten parishes, Avoyelles, Catahoula, Concordia, East Carroll, Franklin, Madison, Morehouse, Richland, Tensas and West Carroll.
- **Southern Hills Aquifer System:** This study includes the areas adjacent and to the east of the Mississippi River covering the following parishes: Pointe Coupee, West Feliciana, East Feliciana, St. Helena, Tangipahoa, Washington, St. Tammany, Livingston, East Baton Rouge, West Baton Rouge, Iberville, Ascension, Assumption, Lafourche, St. James, St. John the Baptist, St. Charles, Jefferson, Orleans, Plaquemines, Terrebonne, Avoyelles, Concordia and St. Bernard Parishes.
- **Regional Groundwater Model of the Sparta Aquifer System:** This ongoing long-term project includes the characterization and groundwater flow modeling of the Sparta Aquifer System of Northern Louisiana. The model will be of all aquifers and aquitards above a base of the Midway Group in northern Louisiana the focus area including twenty Parishes.

Atlas of Oil and Gas Fields in Offshore State Waters of Louisiana. This project aims at producing an “atlas” series consisting of all currently publicly available geological and production information on the oil and gas fields in each offshore area in the State waters of Louisiana. LGS has recently completed an Atlas of the Main Pass Area. Previous atlas publications are for the Chandeleur Sound Area and the Breton Sound area. All are available from LGS Publications. The next atlas proposed will be for the South Pass Area if requisite project funding is obtained to continue this series.

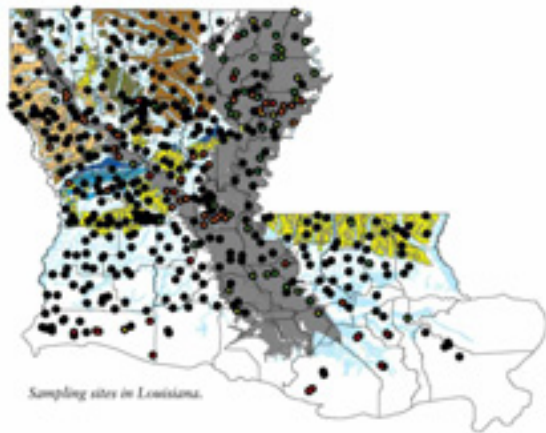
Geological Characterization of the Chicot/Atchafalaya Aquifer Region, Southwest Louisiana. This project was completed in 2009 and resulted in a publication authored by L. Riley Milner and Chad Fisher by the same title. The Chicot aquifer covers an area greater than 10,000²m and has an annual withdrawal rate of approximately 800 million gallons per day. This publication has type logs, detailed cross sections, and hydrologic contour maps showing depths to the top and base of the freshwater. It is available for purchase from the LGS publications.

Monitoring Saltwater Front Encroachment for the Sparta Aquifer in North Central Louisiana. Ground water samples were collected and were analyzed to assess the impact of saltwater encroachment on the Sparta Aquifer. The study assesses the migration of a saltwater front overtime within the aquifer. A draft report was submitted to the Louisiana Department of Transportation and Development (DOTD)-Water Resources Section in June 2009, and is under current review by DOTD and will be published by LGS as a “Report of Investigations” upon approval.

Jurassic Stratigraphy and Nomenclature for the Subsurface of Northwest Louisiana. This study involves identifying litho-stratigraphic markers and intervals in the subsurface Jurassic sequence of northwest Louisiana based upon available geophysical borehole logs and well samples. The goal is to establish a standardized nomenclature that will be useful for exploration and regulatory interests. Results thus far have been



Index map of Louisiana showing location of study areas.



This map was produced as part of the USGS National Geochemical Survey Database. Shaded areas represent recharge areas of Louisiana's aquifer systems. Dots represent soil sample locations.

they integrate all sources of sediments in the stream's drainage basin, and field soil

LGS Publications

In 2009, the Louisiana Geological Survey team produced a large number of publications on topics including aquifer water chemistry; Mississippi River sediment supply; Hurricane Katrina's impact on New Orleans water pumpage and use; Bossier-Haynesville shale geological and geochemical characterization; a map of oil and gas fields of Louisiana; and recycling offshore rigs as renewable power plants. A complete list of journal publications and presentations is available on the LGS website www.lgs.lsu.edu

presented at two conferences; work continues to incorporate greater detail and area.

Geology of Grindstone Bluff near Shreveport, Louisiana.

This study examined, interpreted, and documented the geological features of one of Louisiana's most prominent bedrock exposures located near the city of Shreveport. The results were published in the semi-annual LGS newsletter "NewsInsights."

National Geochemical Survey Database for Louisiana.

The USGS published the National Geochemical Survey Database for Louisiana in 2008. For this project LGS was contracted to collect 510 soil samples across the state with a minimal density of one sample per 289 km² (i.e. based on a 17x17 km sampling grid). Each of these 510 samples were analyzed by the USGS using analytical methods to include 40-element ICP package plus single element determinations of As, Se, and Hg by atomic absorption. The principal samples were based on stream sediments, and if no stream or bayou was located near the pre-chosen sample location a solid field soil sample was collected. Stream sediments were chosen because

Conference Participation

TRIMBLE Dimensions 2009 Conference

LGS research associate Robert Paulsell presented a technical research presentation "Utilizing GPS technology to enhance spatial accuracy of pipeline features in a GIS" at the TRIMBLE Dimensions 2009 conference on February 24 in Las Vegas. The talk described data collection methods and geographic information system (GIS) development for petrochemical pipelines in Louisiana. More than 2400 conference attendees gained valuable insight into global positioning systems (GPS) and other technologies and how advanced application solutions increase productivity.

LGS, BRGS Host Louisiana Groundwater and Water Resources Symposium

This third annual symposium was co-hosted by the LGS and the Baton Rouge Geological Society (BRGS) on March 26, 2009 and held at the Dalton Woods Auditorium of the Energy, Coast and Environment Building at LSU. There were ten oral papers and one poster presentation by authors from LGS, USGS, LSU, University of Louisiana-Lafayette and industry. Symposium attendees were from various Louisiana State agencies, universities, federal agencies and industry. Conference abstracts are available on the BRGS website (<http://www.brugs-la.org>).

Survey Cosponsors NOAA Seminars

The Louisiana Geological Survey, working with NOAA and the U.S. Army Corps of Engineers, teamed up to co-sponsor a series of three one-day training seminars in Louisiana on tides, water levels, sea level rise, and NOAA products, services, and applications in New Orleans, Baton Rouge, and Lafayette. These NOAA training seminars were presented by experts from the Center for Operational Oceanographic Products and Services, Office of Coast Survey, National Geodetic Survey, and the Louisiana State University Center for Geoinformatics. The Baton Rouge seminar, co-ordinated by LGS research associate Hampton Peele, was held on March 25, 2009, at the Dalton Woods Auditorium in the Energy, Coast and Environment Building, and was hosted by the Louisiana Geological Survey. More than 200 attended. The seminars covered overview topics on basic tidal theory, the use of tide and water level data for coastal restoration, coastal protection, hydrographic surveying, tropical storm surge projects and programs, and sea level rise (observed trends and forecasts).

International Astronomy Day

LGS participated with an exhibit booth in the BREC-LSU Highland Road Park Observatory's Third Annual celebration of International Astronomy Day on May 2, 2009, along with other organizations. Research associates Riley Milner and Paul Heinrich manned the LGS display and answered numerous questions from visitors of all ages. The presentation of the discovery of a meteorite impact crater in St. Helena Parish was a very big surprise to all attendees as well the coordinators for the celebration. LGS also had a scope-on-a rope with a petrographic microscope showing thin sections of the Greenwell Springs Meteorite found in the East Baton Rouge Parish backyard of Mr. Frank Rapuana in 1987.

Digital Mapping Techniques (DMT) Workshop 2009

Research associate Robert Paulsell represented LGS at the annual Digital Mapping Techniques (DMT) workshop, hosted in 2009 by the West Virginia Geological Survey and co-sponsored by the United States Geological Survey (USGS) and the Association of American State Geologists (AASG). The DMT brings international, federal, and state geologists, GIS specialists, and cartographers together to discuss computer geologic mapping. Workshop topics ranged from data management, citation, and production to new methods of surficial geologic mapping. Strong emphasis was put on national mapping standards development.

Survey Well Represented at GCAGS/GCSSEPM 2009 Convention

The Shreveport Geological Society was host to the 59th Annual Joint Convention of the Gulf Coast Association of Geological Societies (GCAGS) and the Gulf Coast Section of the Society of Sedimentary Geology (GCSSEPM) September 27-29 in Shreveport. The convention's theme was "A Fusion of Geology and Technology," The technical program was preceded by an all-day symposium concentrating on the Haynesville Shale. LGS faculty and staff made a total of nine presentations. Douglas Carlson was co-chair of the oral session titled "The Wilcox-Outcrop to the Abyss: Part Two." Rick McCulloh participated as co-leader of Field Trip #1 titled "Midway Group and Wilcox Group (Paleocene) Contact."

LGS Participates in Earth Science Week

Earth Science Week 2009, celebrated October 11-17, focused on promoting scientific understanding of a current timely and vital topic – the Earth's climate. At the request of the Louisiana Geological Survey, Governor Bobby Jindal issued a proclamation declaring October 11-17, 2009, as Earth Science Week in the State of Louisiana. Earth Science week is sponsored annually by the American Geological Institute (AGI) and all its member societies on behalf of the geoscience community. More information about

AGI and Earth Science week can be found on their website: (www.agiweb.org and www.earthscienceweek.org).

The Louisiana Geological Survey received 50 teaching kits containing teaching materials related to the focus area and these were distributed to Earth Science Teachers through the Program Coordinator (Jean M. Brett) of the East Baton Rouge Parish Schools Division of Standards Assessment and Accountability.

2009 Brings Changes to LGS Board, Resource Center

LGS Advisory Board Adds Two New Members

LGS welcomes and thanks Don Briggs and Raymond Lasseigne for agreeing to serve on the LGS Advisory Board. Don Briggs is president of the Louisiana Oil and Gas Association (LOGA) and Raymond Lasseigne is chairman of TMR Exploration Inc, Bossier City. Others members of the Advisory Board are Frank W. Harrison, Jr. (Chair), James H. Coleman, William Fenstermaker, Karen Gautreaux, and William B. Daniel, IV.

William Marsalis, previous LGS director and state geologist, decided to step down from his position on the Board citing personal reasons. LGS would like to express its sincere thanks to Bill for his service on the board and let him know that he is always welcome to visit LGS when in town.

LGS Resource Center Moves to New Location

The LGS Resource Center has been moved from its location on Nicholson Extension to a warehouse behind the LSU Graphic Service building on River Road. The Resource center, part of the Louisiana Museum of Natural History as defined by the Louisiana legislature, the only one of its kind in Louisiana, consists of a core repository and a well log library. The core facility has more than 30,000 feet of core from wells mostly in Louisiana and some from neighboring states. The well log library contains more than 50,000 well logs, mostly from Louisiana. The LGS Resource Center is available for use by industry, academia, government agencies, and those who may be interested. For more information, contact Patrick O'Neill at 225/578-8590 or by email at poneil2@lsu.edu.

Survey Staff Recognized for Years of Service, Named to Professional Associations, Boards

LGS Service Award certificates were presented by Director Chacko J. John on October 1, 2009, to Lisa G. Pond (20 years), Patrick O'Neill (20 years) and Riley Milner (15 years) in recognition of dedicated service to LGS/LSU.

John Johnston and Thomas Van Biersel are president and director, and webmaster of the Baton Rouge Geological Survey, respectively.

Douglas Carlson is the secretary-treasurer of the Division of Environmental Geology (DEG) of the American Association of Petroleum Geologists (AAPG).

Chacko John is the Gulf Coast Councillor of the Division of Professional Affairs (DPA) of the American Association of Petroleum Geologists (AAPG). He is a member of the Nominating Committee for the Southeast Louisiana Flood Protection Authority, East (SLFPAAE) and West (SLFPWA) and a member of the Louisiana Ground Water Management Advisory Task Force. He is past President of the Association of American State Geologists (AASG).

Research associate Riley Milner, cartographer Lisa Pond, and research associate Patrick O'Neill were honored for their service to LGS and LSU.



Louisiana Geological Survey Personnel

Chacko J. John, director and state geologist, professor-research

John E. Johnston III, assistant director

Reed Bourgeois, computer analyst 3

Douglas Carlson, assistant professor of research

Brian Harder, research associate 5

Paul Heinrich, research associate 4

Marty Horn, assistant professor of research

Jeanne Johnson, accountant technician

Bobby Jones, research associate 5

Richard P. McCulloh, research associate 5

Riley Milner, research associate 3

Pat O'Neill, research associate 3

Robert Paulsell, research associate 4

R. Hampton Peele, research associate 4

Lisa Pond, research associate 4

Warren Schulingkamp, research associate 4

John Snead, cartographic manager

Thomas Van Biersel, assistant professor of research

The Louisiana Applied and Educational Oil Spill Research and Development Program

www.osradp.lsu.edu

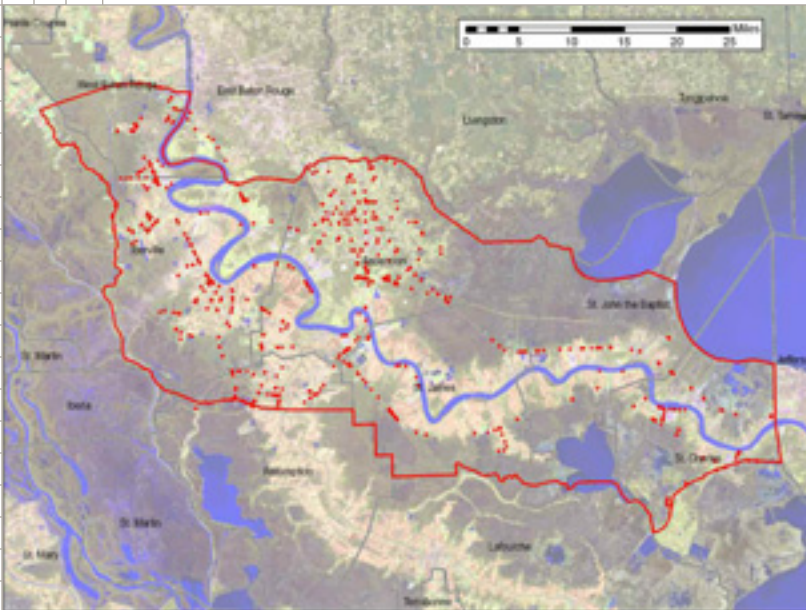
Allan G. Pulsipher · Director

The mission of the Louisiana Applied and Educational Oil Spill Research and Development Program (OSRADP) is to provide oil spill planners and response personnel with practical, scientifically-sound and cost effective spill prevention, management and mitigation tools. Since its inception, OSRADP annually has underwritten 10 to 15 research

projects at Louisiana universities to accomplish this mission.

For nearly two decades, OSRADP has provided the oil and gas industry with an assortment of tools and techniques related to spill response, cleanup and public outreach. Past projects examined cleanup alternatives such as phyto-remediation, bioremediation, dispersant, in-situ burning and various mapping efforts. By examining traditional methods as well as cutting edge techniques, the program provides a range of spill prevention, response and cleanup information to public agencies and private companies throughout the state and nation.

The program was administered through a three-year interagency



Pipeline GIS mapping is an effective tool for disaster prevention and emergency preparedness. Source: Louisiana Geological Survey.

agreement between LSU and the Louisiana Oil Spill Coordinator's Office (LOSCO). The Oil Spill Coordinator's programs are financed by a special, dedicated levy on oil refiners but are subject to annual appropriation by the Louisiana Legislature. Funds were appropriated for the first year of the current three-year agreement (FY2008-09), but were not included in the LOSCO budgets for FY 2009-10 or FY 2010-11. The reason given for the omission was the need to reduce state spending. However, since the program is funded by a dedicated levy on oil and gas companies rather than general revenues, the cuts only reduced the payments by those companies and added no additional revenues for the state. LSU made efforts to get amendments to restore funding for the program added to the budget bills for FY 2009-10 and FY 2010-11, but neither was successful.



Radiation Safety Office

www.radsafety.lsu.edu

Wei-Hsung Wang · Director



Radiation specialist Daryn Bovard conducts an inspection on a dual-energy X-ray absorptiometry unit using an ion chamber.



Research specialist Richard Teague performs routine preventive maintenance service for a liquid scintillation counter.



RSD manager and laser safety officer Mary Haik gives radiation awareness training to Facility Services personnel.

The LSU Radiation Safety Office (RSO), which reports through the Center for Energy Studies (CES) to the LSU Office of Research and Economic Development, is an essential, unique, and vital component to support research and teaching activities involving the uses of sources of radiation at LSU. The LSU broad-scope Radioactive Material License issued by the Louisiana Department of Environmental Quality (DEQ) allows the University maximum flexibility to accomplish legitimate and realistic research and teaching objectives through the effective and efficient operation of a regulatory mandated radiation protection program carried out by the RSO. The RSO implements the radiation control policies and procedures in such a manner so that radiation exposure to faculty, staff, students, the general public, and the environment will be maintained as low as reasonably achievable and that no radiation exposure will be received without societal benefit.

Currently, there are 770 approved radiation workers (including 123 radiation principal investigators) and 222 radiation laboratories under the LSU radiation protection program. The RSO provides training and personnel monitoring for persons who use sources of radiation as well as performs routine site surveys and audits, radiation survey meter calibrations, x-ray equipment inspections, radioactive waste management, and leak tests of sealed radioactive sources for approved radiation laboratories to fully comply with the related regulatory requirements and licensing conditions.

During this fiscal year, the RSO reviewed and approved 78 grant proposals involving the uses of radiation sources. Funds requested by the proposals were \$92,661,760. Actual funds granted to LSU were \$44,736,364.

Due to limited manpower and resources, the CES provides administrative support in accounting and purchasing activities, computer and network maintenance, and personnel management for the RSO.

DEQ Inspects LSU

During this fiscal year, a routine surveillance inspection of the radiation-producing equipment safety program was conducted by an inspector from the DEQ's Emergency & Radiological Services Division. The inspector walked through a dual-energy X-ray

absorptiometry bone density unit and an X-ray diagnostic unit to check the radiation levels, function of the units, qualifications of the operator, and posting requirements. No violations were cited based on the inspector's observations, and no areas of concerns were listed on the DEQ's Field Interview Form.

Research Project to Involve Human Subjects Using Radioactive Material

A research project involving the use of tritium labeled glucose to evaluate the effects of an experimental medication on insulin resistance and insulin secretion for Type II diabetes was proposed. The subject pool would be people with Type II diabetes between the ages of 35 and 70. A known or suspected pregnancy would disqualify any potential female subjects. Breastfeeding by the subject would also be prohibited. Although there are no regulatory limits of radiation doses for voluntary participation in medical research programs, the RSO estimated the dose equivalent to the subject from the infusion of the prescribed experimental medication and concluded that the dose equivalent to the subject is significantly below the annual radiation dose limit for individual members of the public. In addition, no instructions are required to be provided to the subject upon release. A petition to request permission to conduct this research project was submitted to the DEQ and subsequently approved by Ms. Peggy M. Hatch, assistant secretary of Environmental Compliance in the DEQ.

Professional Contributions

Radiation Safety Office director Wei-Hsung Wang joined the CES in 2003 and was promoted to the rank of associate professor in 2008. He was appointed to the Panel of Examiners of the American Board of Health Physics (ABHP) to a five-year term. Health Physics is the application of scientific principles to the protection of humans and environment from the hazards of radiation. The ABHP has been the certification body for the practice of professional health physics and responsible for determining the qualifications of a Certified Health Physicist since 1958. Wang was also appointed to the American Academy of Health Physics' Professional Development Committee to a three-year term. In this capacity, he proposes actions to enhance and promote the professionalism of Certification as well as assists in preparing and reviewing Standards of Qualification and Practice.

Radiation Safety Office Personnel

Wei-Hsung Wang, Ph.D., CHP, CLSO, Director

Mary J. Haik, Manager & Laser Safety Officer

Lorraine Day, Ph.D., CAMD Liaison

Daryn Bovard, Radiation Specialist

Leslie M. Smith, PBRC Liaison

Richard Teague, RRPT, Senior Technologist

Lorrie Gaschen, D.V.M., Ph.D., SVM Liaison

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Sam Bouvier

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Nicholas Kubiak

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