Testimony of Joseph R. Mason, Louisiana State University[1]

before the

Committee on Natural Resources,
U.S. House of Representatives

"The Impacts of Federal Policies on Energy Production and Economic Growth in the Gulf"

September 15, 2015
Embargoed until release: 9:00 am

Louisiana Supreme Court
400 Royal Street, New Orleans, Louisiana.

[1] Views expressed in this testimony are those of the author and do not necessarily reflect official positions of Louisiana State University.

Thank you for the opportunity to testify on this very important topic.

Unfortunately, little has changed in the Gulf region since my initial study on the "The Economic Cost of a Moratorium on Offshore Oil and Gas Exploration to the Gulf Region," in July 2010. Economic activity in the region is still moribund and the outlook for exploration and development remains subdued.

Now, more than five years after Deepwater Horizon, further restrictions are being considered for Gulf drilling operations. Those regulations, like the ones before them, will decrease production activity and the economic growth of the region.

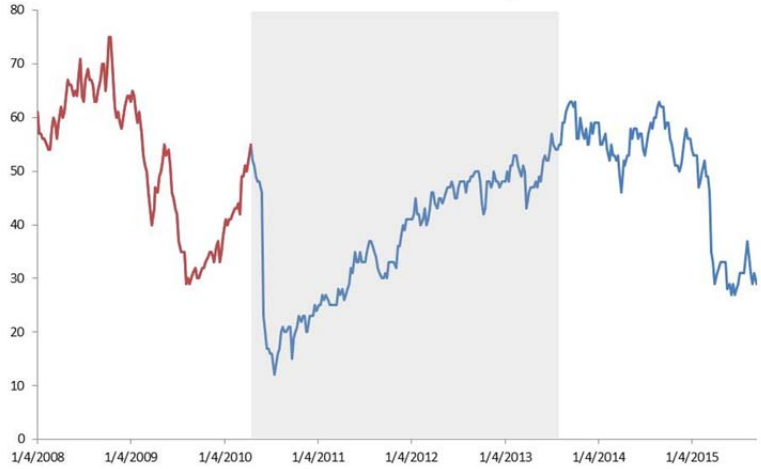
Families will be impacted by lost jobs and wages and students – whether studying oil and gas, alternative energy, or compliance – will be left without job prospects. Such effects will continue to drag down growth in the Gulf Coast region relative to the rest of the country during this crucial period or economic uncertainty when the Federal Reserve is trying to get the economy back on track. Thus, imposing any new regulations at this time will have to be undertaken in a careful and thoughtful fashion in order to preserve jobs and livelihoods during a period of tenuous economic uncertainty.

The State of the Gulf Oil & Gas Industry

My July 2010 study predicted a roughly $2 billion slowdown in economic activity in the Gulf States following the drilling moratorium in May 2010. While it is difficult to disentangle the effect of *just* the moratorium after the fact, real Louisiana GDP from Oil and Gas Extraction fell by $1.6 billion in 2010 remained another $1.3 billion below 2009 real GDP in 2011.

The reason for the slowdown is straightforward. The effects of regulatory actions taken after April 2010 were dramatic and long-lived. Pre-April 2010 rig counts in the Gulf of Mexico did not exceed April 2010 levels until July 2013, more than three years later.

Total Gulf of Mexico Rig Count



Source: Baker Hughes, North American Rotary Rig Count, September 11, 2015.

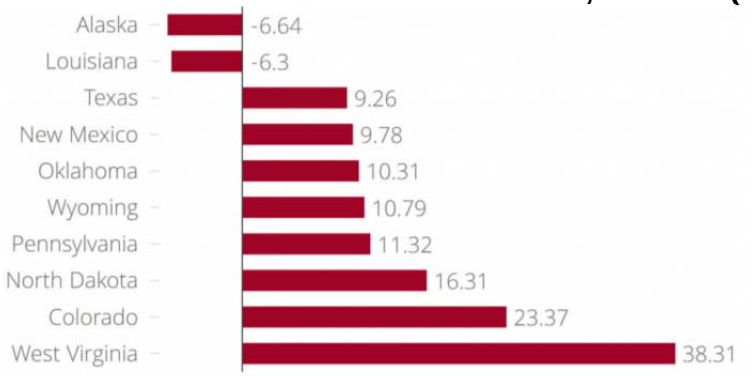
Even after July 2013, however, rig counts in the Gulf of Mexico were not sustained and production has remained relatively flat. As a result, the Gulf of Mexico is still not back to pre-April 2010 production trend levels, measured relative to April 2010 as the midpoint to today.

Source: Energy Information Administration at http://tonto.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFP3FM2&f=M. Trend excludes the effects of hurricanes by linearly extrapolating production as represented by the dashed lines in the graph above.

We continue to see the impact of the post-April 2010 slowdown and more recent trends in local economic activity. Louisiana real GDP from Oil and Gas Extraction fell 15.9% in 2012-13 and another 6.3% in 2013-14.

Overall, states with offshore exposures are growing at a slower pace than those with more onshore focus. Preliminary 2014 GDP data from the Bureau of Economic Analysis shows that GDP from Oil and Gas Extraction slowed by 6.64% in Alaska and 6.30% in Louisiana, while activity grew by almost ten percent or more in the other major oil-producing states with more onshore reserves.

GDP Growth from Oil and Gas Extraction, 2013-14 (%)



Source: Bureau of Economic Analysis

Even the states that did well in 2014, however, can be expected to slow considerably in 2015 due to persistent low oil prices.

The Federal Reserve's September Beige Book, released September 2, 2015, noted that the energy industry has been flat in all of the regions its surveyed.

Since January 2015 to today, the Gulf of Mexico rig count has almost halved.

In its most recent report, the International Energy Agency now forecasts that oil production outside OPEC can be expected to decline by nearly 500,000 barrels a day next year, with the U.S. bearing some 80 percent of that decline. According to the IEA, "Oil's price collapse is closing down high-cost production from Eagle Ford in Texas to Russia and the North Sea… [The OPEC effort] to defend market share regardless of price appears to be having the intended effect."

Clearly, this is a difficult period for Louisiana and the U.S. Oil and Gas sector.

Anticipated Effects of New Regulations

Amidst this difficulty, the U.S. DOI Bureau of Safety and Environmental Enforcement (BSEE) recently published new requirements and procedures related to the proposed rule "Oil and Gas and Sulphur Operations in the Outer Continental Shelf—Blowout Preventer Systems and Well Control." In economic terms, those requirements pose new costs for the offshore oil and gas industry at time when high-cost production is being pushed out of the industry.

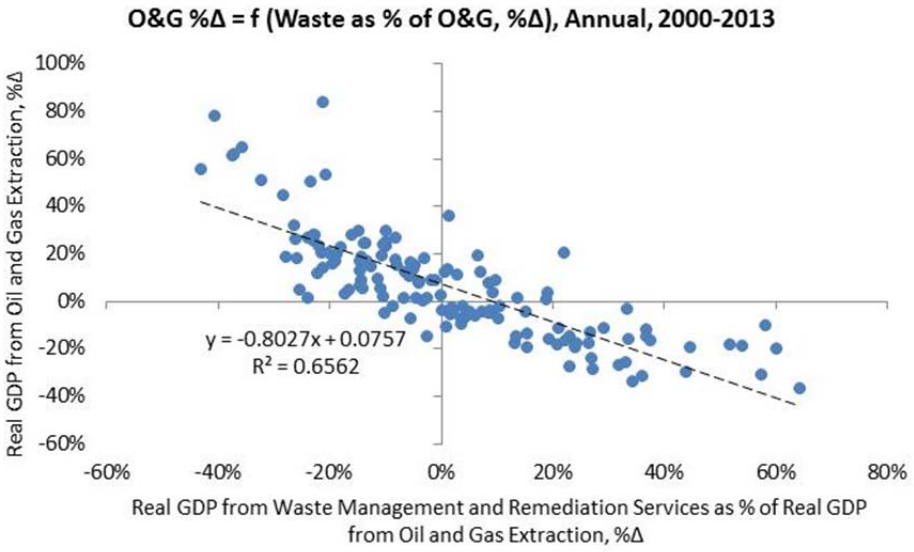
A recent American Petroleum Institute (API) study to evaluate the potential cost and economic impact effects of the proposed rule on oil and gas drilling operations in the US Gulf of Mexico concluded that, "[u]nder the new regulations, approximately around 690 fewer wells are projected to be drilled from 2017 to 2030, a 26 percent decline, with similar water depth distributions. Over the 10-year 2017 to 2026 period the projected number of wells projected not to be drilled equals around 470, with an average of 20 fewer exploration wells per year and 29 fewer development wells." ("BSEE Proposed Well Control Rule Cost and Economic Analysis," API, July 2015, at p. 26)

Such conclusions should come as no surprise. Quite simply, increased costs should result in lower supply. In order to demonstrate the universality of such a relationship, I regressed the percent growth in (real) state GDP from oil and gas extraction on the percent growth in (real) state GDP from waste management and remediation as a proportion of that from oil and gas extraction in the top ten oil and gas-producing states annually, from 2000-2013.[2]

[2] The states used in the model are Alaska, Colorado, Louisiana, New Mexico, North Dakota, Oklahoma, Pennsylvania, Texas, West Virginia, and Wyoming. Data from 2000-2014 yields 140 observations. Data are from the Bureau of Economic Analysis.

It is important to keep in mind that waste management and remediation comprises a wide range of activities, not just those related to oil and gas extraction.[3] Such breadth, however, should make it more difficult to find a significant relationship with oil and gas extraction.

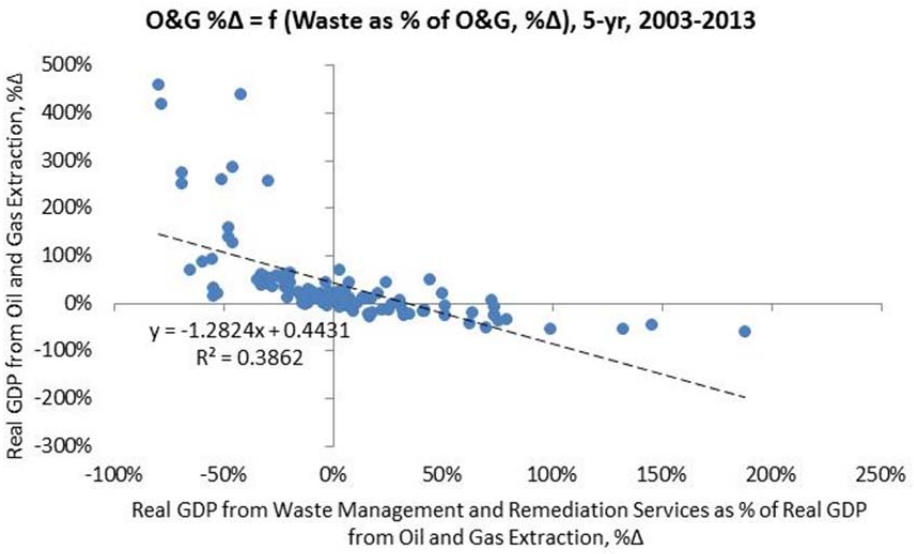
The results, displayed below, are striking. On an annual basis, the growth in economic activity devoted to waste management and remediation has a strong and statistically significant negative effect on oil and gas production. The coefficient on waste management and remediation's effect on oil and gas production is just over 0.8, suggesting that an additional percent of economic activity related to waste management and remediation (as a percent of oil and gas extraction) reduces activity in oil and gas extraction by 0.8%.



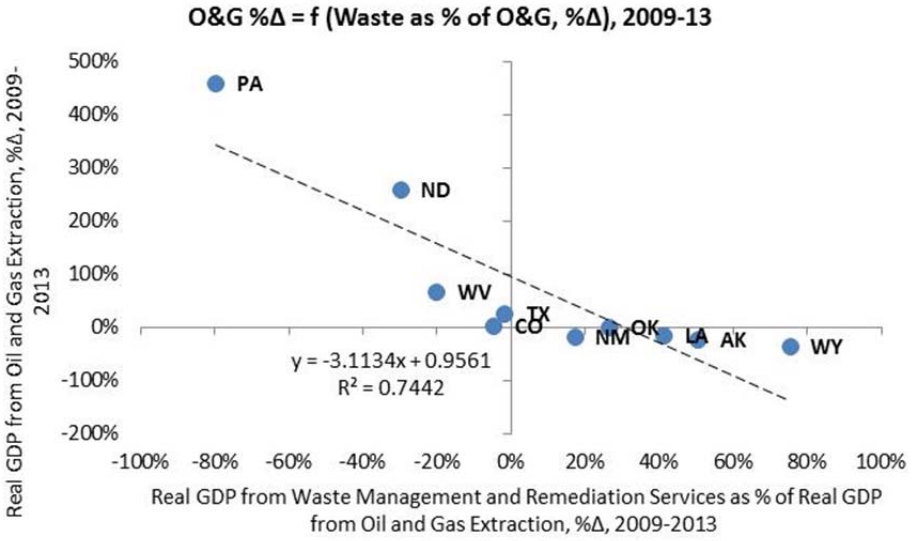
One might expect, however, that if the source of growth in waste management and remediation is new regulation, then the effect on oil and gas extraction would strengthen with a longer time lag. That is exactly the result we see below, where instead of measuring the effect with annual changes to both variables I use changes over a five-year period (resulting in 100 observations rather than 140).

The results below show that the coefficient magnitude in the relationship from 0.8 to just under 1.3, suggesting that a five year period captures more of the hypothesized effect.

[3] "Businesses engaged in the collection, treatment, and disposal of waste materials. Includes businesses engaged in collecting and/or local hauling of waste and/or recyclable materials; operating waste treatment or disposal facilities (except sewer systems or sewage treatment facilities); operating materials recovery facilities (those that sort recyclable materials from the trash stream); providing remediation services (those that provide for the cleanup of contaminated buildings, mine sites, and soil or ground water); and providing septic pumping and other miscellaneous waste management services, such as portable toilet rental services." (See http://www.bea.gov/industry/pdf/2012_industry_code_guide.pdf)



Last, I examine how the relationship between economic activity in waste management and remediation and oil and gas extraction may have changed over time. The last panel suggests that in recent years, the relationship may have strengthened considerably, with the coefficient rising from just under 1.3 to 3.1, so that an additional percent of economic activity related to waste management and remediation (as a percent of oil and gas extraction) reduces activity in oil and gas extraction by 3.1%.



The results above cannot be considered a complete analysis of regulatory dynamics, but may constitute a set of results suggesting that each dollar of regulatory cost imposed upon the oil and gas industry may result in a larger cost than the last. In economic parlance, the marginal cost of additional regulation may *rise* with existing regulation, rather than remaining constant. If that is the case, policymakers would want to be cognizant of existing costs before adding new ones.

Higher Education and Workforce Impacts

Like economic growth, employment growth in oil and gas extraction has lagged in Alaska and Louisiana relative to other oil-producing states. From 2009-2013, employment in oil and gas extraction has grown 27.84% in Louisiana and 30.76% in Alaska, relative to 43.03% in the other major oil producing states (Colorado, North Dakota, New Mexico, Oklahoma, Pennsylvania, Texas, Wyoming, and West Virginia).

Still, the oil and gas extraction sector is an important employment base in all of these states. Such importance is heightened by educational programs devoted to energy and the environment in all such states, as well as elsewhere in the U.S.

Recently, Louisiana State University (LSU) reviewed the scope and extent of energy-related education and research at LSU. Like many universities, LSU's energy-related research spans a wide range of topics including upstream oil and natural gas drilling and production topics (including hydraulic fracturing), geology, solar, wind, biomass, geothermal, materials, efficiency, electrical conductivity, nuclear, environmental impacts, and socioeconomic impacts.

Research

While LSU is typically associated with oil and gas, the majority of LSU's externally funded energy research is not associated with fossil fuels but renewables.

Summary of LSU Energy-related Research by Topic Area

Topical Area	Funding	Percent of Total	Number of Projects	Average Award per Project
Environment	$ 17,297,166	18%	43	$ 402,260
Fossil Fuels	$ 14,506,904	15%	43	$ 337,370
Materials	$ 18,815,701	19%	25	$ 752,628
Renewable	$ 43,019,831	44%	29	$ 1,483,442
Other	$ 4,288,593	4%	13	$ 329,892
Total	**$ 97,928,195**	**100%**	**153**	**$ 640,054**
Note:"Other" includes aerospace, electricity, nuclear and socioeconomic.				

Source: LSU Office of Research and Economic Development

LSU's renewable energy research, estimated at close to $43 million over the past seven years, accounted for almost half (44 percent) of all energy-related research. Materials science–based energy research accounted for close to $19 million, or 19 percent, of LSU's total energy research funding over the past seven years. Research associated with energy and the environment is estimated to be the third-largest research topic, accounting for close to $17 million in externally funded energy projects over the past seven years. Fossil fuels research come in last, behind those three areas.

LSU College Budgets and External Energy Research Funding

College/Research Unit	Budget (FY 2014/15)	Research Funding (2007-2014)	Percent of Total
Agriculture	$ 7,488,438	$ 38,642,116	516%
Art & Design	$ 6,945,356	$ 2,460,000	35%
Business*	$ 16,999,443	$ 1,257,973	7%
Center for Energy Studies	$ 1,953,889	$ 4,492,286	230%
Coast & Envinronment	$ 6,201,707	$ 12,033,649	194%
College of Science	$ 37,172,392	$ 6,328,234	17%
Engineering	$ 23,035,977	$ 32,713,937	142%
Total	**$ 99,797,202**	**$ 97,928,195**	**98%**
*State operating budget FY2013/14			

Source: LSU Office of Research and Economic Development

The academic units involved in such research vary widely, as well. LSU's College of Agriculture accounted for 39 percent of energy-related research funds ($38.6 million) in the past seven years. The College of Engineering has generated the second-largest level of externally funded energy research. The School of the Coast & Environment generated the third-largest level of externally funded energy research at $12 million over the past seven years.

The College of Science is estimated to have generated over $6.3 million in external funding for research projects in the past seven years, while the Center for Energy Studies has been awarded approximately $4.5 million in externally funded research.

LSU's School of Art & Design contributes to work on coastal sustainability and the E. J. Ourso College of Business maintains a variety of programs related to Environmental Economics and Emissions Trading.

The table above also shows that external funding for energy research approximately equals all of the University funding, in the aggregate, for the Colleges involved.

Teaching

Much of that money is plugged back into course development and student support for education and workforce training in those fields. LSU offers a number of degrees and minors/concentrations that are relevant to energy issues. Relevant degrees include those in engineering (petroleum, electrical, chemical, agricultural and biological, and mechanical), law, geology, basic sciences, environmental science, and oceanography/coastal sciences.

Energy-relevant undergraduate and graduate courses are taught in the areas of fossil fuels, renewable sources, electricity, nuclear energy, and law. Most fossil fuels courses are taught in Engineering, Geology & Geophysics, and similar departments. Courses on renewables are taught in Agricultural Economics, Civil Engineering, Chemical Engineering, Economics, Environmental Sciences, Petroleum Engineering, and the School of Renewable Natural Resources. Electricity-related courses are offered in Chemical, Mechanical, and Electrical engineering. Nuclear classes are in the

Department of Mechanical & Industrial Engineering and the Nuclear Science Minor in the College of Science. Finally, courses on energy law are taught at both Environmental Science and the Law Center.

Enrollment in energy-related courses is strong. Estimates suggest that roughly 10% (almost 3,000) LSU Undergraduate and Graduate students study energy-related fields. About half of those engaged in such study do so through the Petroleum Engineering program, with the remainder distributed across Agriculture, Art & Design, Gulf Coast & Environment, Science, Law, and Business.

Many new initiatives are taking shape at LSU, as well. The College of Business is launching a specialization in energy studies, including courses such as Energy Economics Policy, Petroleum Accounting, and Product Lifecycle Management, plus courses offered in the College of Engineering, College of Science, and School of the Coast & Environment. Similarly, the Law School offers a Graduate Certificate in Energy Law and Policy to officially recognize students who have demonstrated substantial competence in the study of energy law and related subject matter.

Enrollment in energy courses and certificates and majors related to energy, however, may severely understate the importance of workforce development to students in our region. For instance, even though the College of Business energy courses are relatively new to the University, Bloomberg reports that 18% of LSU business school grads go the oil & gas and energy sectors. In contrast, the next highest sectoral concentration, 15%, goes to financial services. The top recruiters of LSU business grads are reported to be Ernst & Young LLP, Postlethwaite & Netterville APAC, ExxonMobil, and Shell. The College of Business reports that their graduates boast the highest mid-career earnings among peer institutions, largely due to energy industry employment.

Workforce Development

LSU also undertakes many energy-related initiatives focusing on workforce development, worker safety, continuing education, and various energy specializations.

For instance, the Petroleum Engineering Research and Technology Transfer (PERTT) Laboratory conducts training at an industrial-scale facility for future oil industry employees. The Donald and Gayle Keller Building provides a classroom and computer lab for professional training. In 2009, in partnership with Entergy Corporation, LSU initiated a Nuclear Power Workforce Development Program. The Nuclear Power Workforce Development Program works in conjunction with the Medical Physics and Health Physics program, which offers classes in radiation protection, exposure evaluation, and nuclear facility safety.

LSU also offers continuing education programs to professionals in a variety of energy-related fields. For example, LSU's Continuing Education office offers a Certified Occupational Safety Specialist program for which participants receive a 10-hour Occupational Safety and Health Administration (OSHA) completion card. The Mineral

Law Institute's annual symposiums offer continuing education credits for lawyers and other professionals, such as certified engineers and city planners. A large number of sessions at conferences held by the Center for Energy Studies are also registered for continuing legal education. The Department of Petroleum Engineering works with the Society of Petroleum Engineers to offer short courses and continuing education credits, including Professional Ethics for Petroleum Engineers and Mechanical Tubing Forces: Temperature, Ballooning, Piston, and Buckling Effects. The Department of Chemical Engineering also offers an online course Essentials of Chemical Engineering for Non-Chemical Engineers.

Thus, LSU is inextricably intertwined with the energy industry and the Gulf of Mexico. Higher production costs will reduce grant funding, class offerings, and student placements. Existing professionals who may be laid off will not need certifications or continuing education. Further declines in higher education in Louisiana and similar states will be unavoidable.

Summary and Conclusions

Energy production in the Gulf of Mexico is still hobbled by the drilling restrictions put in place after April 2010. Since then, OPEC's competitive strategy continues to depress oil prices worldwide, resulting in the current state of the industry in which the economics of production are expected to break within the next year.

As I have testified previously, any regulatory policy that raises pecuniary and/or nonpecuniary costs will slow production. Production will inevitably decline in response to higher costs and greater political uncertainty. In both cases, that means less jobs, lower wages, and lower GDP growth than would otherwise occur. Those immutable laws of economics will bind whether policymakers like them or not. And in today's competitive environment, higher U.S. production costs will drive more market share to OPEC, just as their leaders hope.

Slow economic growth hurts further development of clean energy. (After all, why make it if nobody can afford it?) The stress of higher costs put upon local economies like that of Louisiana actually *hurts* the development of new clean energy sources. University research like that at LSU is driving the next generation of clean energy. We need a smooth regulatory and research policy path to a clean energy world, lest we stay stuck in the mire of economic recession that prevents the conversion to the new energy sources we all hold dear.

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