

**THE ENERGY SECTOR: STILL A GIANT ECONOMIC
ENGINE FOR THE LOUISIANA ECONOMY**

by

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EXECUTIVE SUMMARY

This study is an update of a study done for Mid-Continent Oil and Gas in 1996, and updated in 2002 and 2007 entitled, "The Energy Sector: A Giant Economic Engine for the Louisiana Economy." Our conclusions from this review of the impact of the extraction, refining, and pipeline industries can be summarized in a series of bullet points:

- Louisiana, through the luck of natural resource distribution, is the nation's **number one producer of crude oil and the number three producer of natural gas** among the 50 states.
- Louisiana ranks **number two among the states in petroleum refining** capacity.
- There are nearly **125,000 miles of pipelines** transporting crude petroleum and natural gas within the state and in its offshore area of the Gulf of Mexico.
- Through both their direct and multiplier effects **these three industries supported \$77.3 billion in sales in Louisiana firms, generated over \$16.1 billion in household earnings for Louisianans, and supported 310,217 jobs in the state in 2009.** The \$16.1 billion in earnings represented 13.6 percent of total earnings in Louisiana in that year. Eighty-six of the 185 countries ranked by the World Bank have smaller gross domestic products than \$16.1 billion.
- On average **the job multiplier for these three industries was 5.0.** That is, for every job created in these sectors 4.0 additional jobs are created in other sectors in the state. The job multiplier for the oil and gas extraction industry is about 3.7 and for the very capital-intensive refinery industry it is about 11.1, to no small extent because the state's refineries spent a massive \$2.9 billion on capital expenditures in 2009.
- These three industries directly **paid nearly \$1.4 billion in state taxes and fees** in FY10, or about 15.5 percent of total state taxes, licenses, and fees collected. Through the \$16.1 billion in household earnings generated by these three industries, **state government indirectly was able to collect an additional \$1,125,100,000 in taxes** in FY10, for a total boost to the state treasury of **\$2.5 billion in FY10.**
- A very conservative estimate is that these three industries directly **paid \$298 million in ad valorem taxes to local governments** in the state in 2009. In 41 of the state's 64 parishes, these ad valorem taxes exceeded \$1 million. In 18 parishes the number exceeded \$5 million. Dramatic increases in property tax receipts occurred in Caddo, Bossier, Desoto and Red River Parishes as a result of the new activity in the Haynesville Shale. The \$16.1 billion in household earnings generated by these three industries added approximately **\$707,200,000---nearly three-quarters of a billion dollars---indirectly** to the treasuries of local governments in FY10, for a total of just over **\$1 billion contributed to local government treasuries.**

- In 2010, there were **62,417 workers employed** in the extraction, pipeline, and refining industries--a number approximately equivalent to the 2008 population of Acadia Parish, the 18th most populous parish in the state. Fifty-six of Louisiana's 64 parishes had total covered employment smaller than this number in 2010.
- These three industries paid over **\$5.0 billion in wages** for Louisiana households in 2010---a figure equivalent to 6.8 percent of total covered wages in the state that year.
- In the second quarter of 2010, the average weekly wage in Louisiana's manufacturing sector was \$1,097. **In refining it was 60 percent higher at \$1,757 and the extraction sector paid \$1,991 weekly---81 percent higher than the average in manufacturing. Weekly wages in the pipeline industry were \$1,498---37 percent higher than the average manufacturing wage.**
- **Energy jobs and earnings are found in all of Louisiana's 64 parishes in 2010.** There were 15 parishes where more than 1,000 workers were employed in these three industries. In Lafayette Parish (the highest employment parish), 14,696 workers were directly employed in these energy sectors.
- Value added is a broader measure of the total income created directly in an industry. In 2007 (latest data available), **Louisiana's oil and gas extraction sector produced nearly \$43 billion in total income.** That figure exceeds the **sum** of all the state's manufacturing sectors.
- The refining sector's value added in 2009 was \$11.4 billion. That figure was 27.4 percent of the total value added the state's manufacturing sectors.

THE ENERGY SECTOR: STILL A GIANT ECONOMIC ENGINE FOR THE LOUISIANA ECONOMY

I. Introduction: It's the Engine That Matters

Survey car owners and you will find a consensus on one issue: It is the engine that makes the difference. A weak, undependable engine gets you nowhere. It is a drag on your attempts to get things done. On the other hand a strong, powerful engine gets you where you need to go quickly and dependably. Much gets accomplished.

In the world of economics, some states have only weak engines for economic growth. Their basic industries are either non-existent or are made up of slow-growing, low-wage manufacturing firms. These states are doomed to remain at the bottom rung of the economic ladder, and their prospects for growth are lackluster at best. Examples would be the states of Arkansas and West Virginia.

Other states, either because of the sheer luck of the draw in resource distribution and/or because of innovative development policies, have attracted industries that are veritable dynamos of energy---creating high-wage jobs and spillover business for all kinds of firms. These states not only enjoy the benefits of healthy jobs and income, but also state and local government treasuries get a boost from taxes and fees these industries generate both directly and indirectly.

Louisiana Was Lucky

When it came to the geographical distribution of natural resources, Louisiana won the flip, so to speak. Below her borders, and in the waters of the adjoining Gulf of Mexico, lies a virtual mother-lode of oil and natural gas. Table 1 details Louisiana's oil production relative to her sister states.

Louisiana is the nation's number one producer of oil, producing nearly 1.55 million barrels a

day in 2010 (this figure includes the federal outer continental shelf production). This represents 27.7 percent of the nation's crude oil production, just ahead of Texas, with Alaska in a distant third place.¹

Louisiana was ranked third in this category back in 1995, behind both Texas and Alaska. However, declining reserves in those two states, coupled with larger finds in Louisiana's offshore region, have pushed Louisiana up to the number one slot.

Table 1
Crude Oil & Lease Condensate Production in U.S.: December 24, 2010
(1,000 Barrels per Day)

Area	Production	Percent U.S.
United States	5,588	100.0%
<i>Louisiana*</i>	<i>1,550</i>	<i>27.7%</i>
Texas	1,467	26.3%
Alaska	625	11.2%
California	618	11.1%

*Includes Federal offshore production

The U.S. is also heavily reliant on Louisiana as a source of natural gas, although the full impact of the state in this arena is somewhat hidden in the data. As Table 2 shows, Louisiana ranks third in the U.S. in natural gas production using only state-specific data. Within Louisiana's jurisdictional boundaries comes 10 percent of the country's marketed value of natural gas---a total of just over 2.2 billion cubic feet. However, note in Table 2 that another 10.8 percent of the country's natural gas comes from federal waters in the Gulf of Mexico, a region heavily supported by Louisiana. If this production is added to Louisiana's state-specific numbers, Louisiana would be responsible for almost 21 percent of U.S. natural gas production and would be ranked number 2 (behind Texas) among the 50 states.

Table 2
Marketed Value of Natural Gas in U.S.: 2010
(Billions of Cubic Feet)

Area	Production	Percent U.S.
United States	22,563	100.0%
Texas	6,672	29.6%
Gulf Of Mexico Offshore**	2,444	10.8%
Wyoming	2,323	10.3%
<i>Louisiana*</i>	2,246	10.0%
Oklahoma	1,826	8.1%
New Mexico	1,322	5.9%

*Excludes Federal offshore production. **Data are for 2009.

Source: http://www.eia.gov/cfapps/state/state_energy_rankings

Refineries

The tasks of exploring for and lifting these two resources to the surface---what economists label oil and gas extraction---have created thousands of jobs and billions in household income for Louisianans each year. It has also attracted closely related industries to the state as well. For example, **Louisiana ranks number two among the 50 states in petroleum refining capacity** (see Table 3). Louisiana ranks below Texas and ahead of California by this measure.

Table 3
Petroleum Refining Operating Capacity: 2010
(Millions of Barrels per Calendar Day)

Area	Refinery Capacity	Number	Percent U.S. Capacity
United Sates	16.850	137	100.0%
Texas	4.682	27	27.8%
<i>Louisiana</i>	<i>3.018</i>	<i>17</i>	<i>17.9%</i>
California	1.860	18	11.0%
Illinois	0.918	4	5.4%

Source: Energy Information Administration, Refinery Capacity 2010

It is interesting to note that our refining industry is quite different from that of California. California uses 18 refineries to refine its 1.9 million barrels of crude a day. Louisiana, on the other

hand, uses 17 refineries to handle 62 percent more crude per day (3.0 million barrels). California refines its crude in relatively small refineries. Louisiana uses much larger refineries. Indeed, the ExxonMobil refinery in Baton Rouge is the second largest refinery in the country and the eleventh largest in the world.² In addition, California refineries serve only California, while Louisiana refineries serve Louisiana, Texas, Mississippi, Illinois and the eastern seaboard.

It is also interesting to note that in 2010, the Marathon Refinery in Garyville, Louisiana completed a \$3.9 billion expansion that added 180,000 barrels per day of capacity to its facility. That refinery is now the third largest in the U.S.

Pipelines

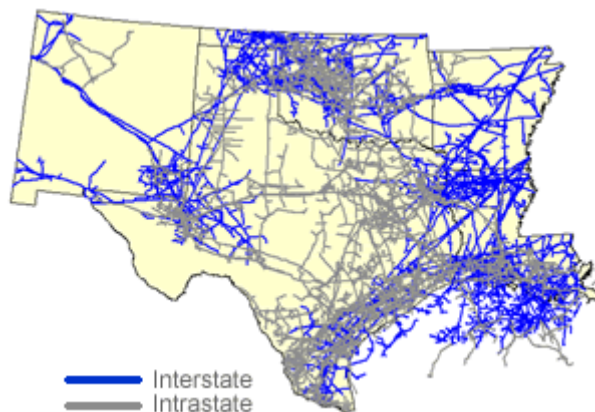
A second closely related industry to oil and gas extraction is the **pipeline industry**. Because pipelines are effectively hidden from view, Louisianans are little aware of the massive amount of oil and gas products that move underground in this state. Consider these figures:

- There were 87,764 miles of pipelines in onshore Louisiana in 2010.³ These pipelines carry crude oil, natural gas, petrochemical products, LPG/NGL, gasoline, jet fuel, and refined products.
- In 2010, there were 37,000 miles of active and proposed pipelines in offshore Louisiana, outside the state's jurisdictional boundaries.⁴

These 124,764 miles of pipelines are the ones for which reasonable data are available because they fall under direct state or federal regulation. These are not pipelines transporting chemical products with no petroleum base. Figure 1 gives readers a sense of just how intensively the industry is concentrated in our state.

Figure 1

Map of Interstate and Intrastate Natural gas Pipelines: Southwest Region



Source: www.eia.doe.gov. Natural Gas Pipelines in the Southwest Region

The Trip Ahead

How has such a massive industry affected the economic lives of Louisiana citizens? If the extraction, refining, and pipeline industries are lumped under one heading---the energy industry---has it been a weak or powerful economic engine? Has the whole state benefited from its presence, or have any economic effects been limited to only a few parishes? Are the multiplier effects on other industries in Louisiana small or large? Has the industry's impact on state and local treasuries been trivial or significant?

These are the topics covered in the sections to follow. Section II is devoted to the direct income and employment effects of the energy industry. How many people are employed in it and what is the nature of the wages paid its employees? Section III uses an input/output table to estimate the multiplier impacts of the energy industry. In which sectors are employees benefiting the most from

these possible spillover effects? In section IV, the contribution to state and local treasuries is measured along with a discussion of the ten-year industrial tax exemption program. Section V presents tantalizing evidence about remarkable technological changes in these industries. Section VI contains the summary and conclusions. Appendix A contains an analysis of the impact of the BP oil spill on the first anniversary of that event.

II. The Direct Employment and Income Impacts

A helpful way to think about an industry's impact on a state is to think of the state's economy like a large economic pond. Into this pond we are going to drop a rock labeled "oil and gas extraction, refining and pipeline industries". Would such a rock make much of a splash in the pond? It is these **direct impacts** that we attempt to measure in this section. In section III, we will examine the extent of the ripples (the multiplier effects) this rock makes in the pond as the ripples work their way to the shore.

Covered Employment and Wages

By far the most detailed and reliable information on employment and wages in these three industries are the data gathered by the Louisiana Workforce Commission on **covered employees**, i.e., covered by unemployment compensation regulations. Because of legal reporting requirements, detailed data are available down to the parish level in most cases.

Covered Employment

Table 4 contains information on covered employment and annual wages paid in these four energy industries. **In 2010, there were 62,417 covered workers employed in the oil and gas extraction, support activities for mining, refining, and pipeline industries.**⁵ To get some idea of the relative size of this number, in January 2010 fifty-six of Louisiana's 64 parishes had total covered employment less than 62,417.⁶ **The number of persons employed in these industries is approximately equivalent to the 2008 population of Acadia Parish (59,936), the 18th most populous parish in the state.**⁷

Table 4
Employment and Annual Wages Paid
in Petroleum-Related Industries: Louisiana
2010-II

Sector	Employment ^a	Annual Wages Paid ^b
Oil & Gas Extraction	8,483	\$878,336,761
Support Activities for Mining	39,756	2,873,417,204
Petroleum Refining ^c	11,567	1,054,638,428
Pipelines	2,611	203,398,272
TOTAL	62,417	\$5,009,790,655

Source: www.Laworks.net. Go to LMI section. ^a Second quarter data. ^b Annual estimate based on 2010-II data. ^c Data are for “petroleum & coal products” sector which is 98 percent petroleum refining.

Covered Annual Wages

What is more remarkable is the impact of these three industries on the incomes of Louisianans who work in these four sectors. According to the data in Table 4, **these three industries generated over \$5 billion in covered wages for these workers in 2010.** These four industries, through their direct effects alone, **generated 6.8 percent of the total covered wages earned in Louisiana in 2010.**⁸

Comparative Weekly Wage Rates

One reason these annual wage numbers are so large is because these four sectors are among the highest wage industries in the state. Table 5 provides data on the average weekly earnings in these four sectors and Louisiana's manufacturing industries in the second quarter of 2010.

Table 5
Average Weekly Wage – Second Quarter 2010
Louisiana Petroleum-Related Industries & Manufacturing

Sector	Average Weekly Wage
<i>Oil & Gas Extraction</i>	<i>\$1,991</i>
<i>Petroleum & Coal Products(98% Refinery)</i>	<i>1,757</i>
Chemicals & Allied Products	1,605
<i>Pipeline Transportation</i>	<i>1,498</i>
<i>Support Activities for Mining</i>	<i>1,390</i>
Paper Manufacturing	1,233
Primary Metals Manufacturing	1,110
Computers & Electronics	1,094
Transportation Equipment	1,057
Machinery Manufacturing	1,038
Fabricated Metals	963
Plastics & Rubber Products	860
Beverage & Tobacco Products	825
Non-metallic Minerals	819
Wood Products	754
Food manufacturing	669
Printing & Related Products	668
Miscellaneous Manufacturing	665
Furniture Manufacturing	595
Textile Products	555
Apparel Products	533
Average Manufacturing Wage	\$1,097
Average Wage in All Sectors	\$769

Source: www.Laworks.net. Go to LMI section. Louisiana Statewide Employment and Total Wages, Second Quarter 2010.

Note that the oil and gas extraction and refining sectors rank #1 and #2, respectively among the industries listed, with pipeline wages ranking #4 and support activities for mining ranking #5. **Oil**

and gas extraction's weekly wage of \$1,991 is a whopping 82 percent higher than the average wage in manufacturing (\$1,097). Even more telling is that oil and gas extraction wages are two and a half times larger than the average wage earned by a Louisiana worker (\$769 per week). Refining wages are 60 percent higher than the average manufacturing wage. Both oil and gas extraction and refining are unusually capital-intensive industries requiring very skilled labor for their operations.

Our review of the direct wage and employment impacts of these industries reveal something important about the energy sector. This economic engine is far from small. **It has been a powerful factor for creating thousands of high-wage jobs in Louisiana.**

Job Distribution across the State

Have the benefits of these excellent jobs been narrowly confined to just one area of the state, or have they been more widely distributed across Louisiana? One advantage of the covered employment data is they are available by parish, except where disclosure rules prevent their release.

Table 6 contains the distribution of reporting units, employment, and annual wages paid in the three energy industries by parish for the second quarter of 2010. The data to construct this table were provided by the Research and Statistics Unit of the Louisiana Workforce Commission. The Department cannot release data at the parish level unless there are a minimal number of reporting units. Too few a number of reporting units kicks in disclosure rules which ensure that an individual firm's employment and wage data cannot be identified.

The most important message from Table 6 is that the benefits of the energy sector are widespread across Louisiana. **Energy jobs and income were found in all of Louisiana's 64 parishes in 2010.** There were 15 parishes where more than 1,000 persons were employed in the

energy sector, and in Lafayette Parish there were 14,696 persons working directly in the energy sector. There were 14 parishes where between 300 and 999 persons were directly employed in the energy sector.

Table 6
Number of Reporting Units, Employment, and Annual Wages in Oil and Gas
Extraction, Support Activities For Mining, Refining and Pipeline Industries by Parish:
Second Quarter 2010

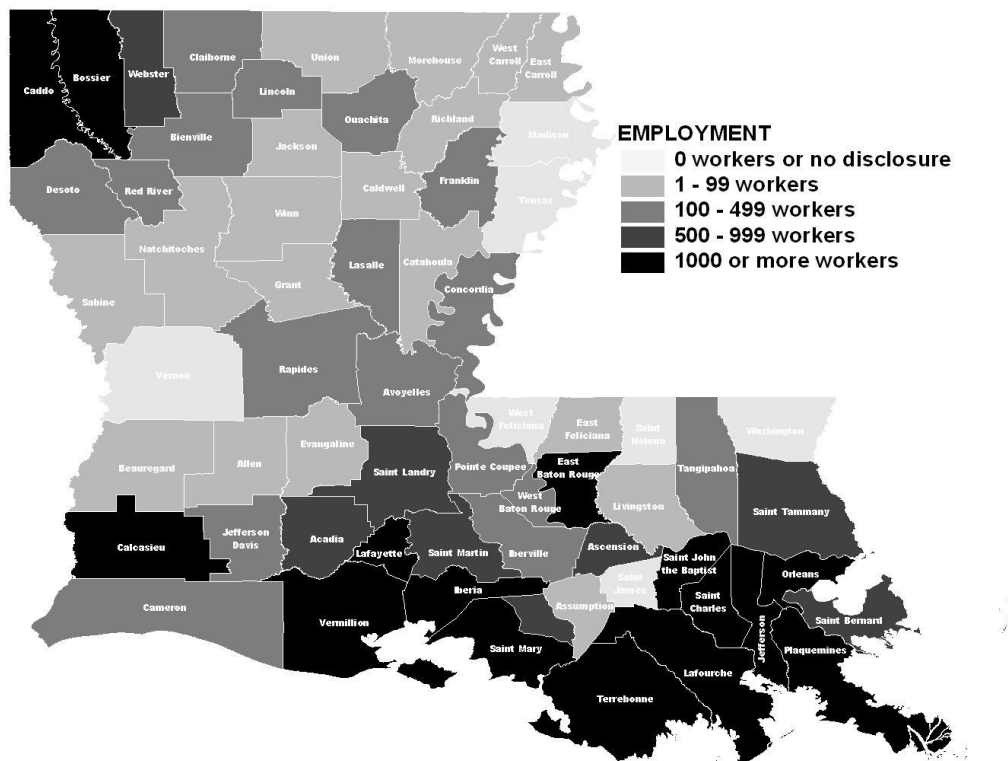
Parish	Units	Average Employment	Total Wages Paid
ACADIA	43	621	\$ 36,077,084
ALLEN	3	69	5,217,312
ASCENSION	16	833	74,972,068
ASSUMPTION	9	33	2,621,580
AVOUELLES	9	160	14,366,452
BEAUREGARD	12	58	3,430,848
BIENVILLE	22	148	9,397,892
BOSSIER	68	2,230	160,135,896
CADDO	249	3,184	234,939,520
CALCASIEU	65	3,468	269,731,156
CALDWELL	7	52	2,962,384
CAMERON	26	239	13,194,344
CATAHOULA	8	80	3,094,256
CLAIBORNE	24	372	21,601,400
CONCORDIA	16	221	10,053,068
DESOTO	24	447	29,993,304
E. BATON ROUGE	58	2,762	233,828,172
E. CARROLL	3	4	223,828
E. FELICIANA	4	81	5,782,600
EVANGELINE	6	10	262,356
FRANKLIN	3	100	4,658,320
GRANT	3	4	80,944
IBERIA	70	3,161	204,891,944
IBERVILLE	15	412	26,410,764
JACKSON	3	71	3,978,016
JEFFERSON	82	2,341	209,877,248
JEFF. DAVIS	19	303	15,163,280
LAFAYETTE	378	14,696	1,181,429,216
LAFOURCHE	61	1,140	82,811,544
LASALLE	31	431	22,968,932
LINCOLN	14	102	6,167,136
LIVINGSTON	11	67	2,374,492

MADISON	2		
MOREHOUSE	4	24	1,200,128
NATCHITOCHE	7	44	3,191,644
ORLEANS	68	3,534	446,905,480
OUACHITA	38	192	10,800,180
PLAQUEMINES	51	1,615	128,831,872
POINTE COUPEE	7	140	11,365,512
RAPIDES	12	187	15,567,188
RED RIVER	4	118	10,981,868
RICHLAND	7	41	1,960,220
SABINE	11	49	1,890,140
ST. BERNARD	14	842	97,471,072
ST. CHARLES	13	1,691	151,734,640
ST. HELENA	1		
ST. JAMES	9		
ST. JOHN	8	1,494	144,740,116
ST. LANDRY	22	569	48,107,712
ST. MARTIN	27	513	26,604,796
ST. MARY	51	2,417	186,800,676
ST. TAMMANY	48	549	48,816,136
TANGIPAHOA	8	408	19,192,904
TENSAS	2		
TERREBONNE	134	5,033	382,075,876
UNION	6	17	676,896
VERMILION	44	1,087	89,398,736
VERNON	2		
WASHINGTON	7		
WEBSTER	29	905	51,167,420
W. BATON ROUGE	6	335	28,955,960
W. CARROLL	3	23	1,039,316
W. FELICIANA	1		
WINN	9	95	5,452,860

Source: Louisiana Workforce Commission

Map 1 provides a visual illustration of the distribution of energy jobs across the 64 parishes. From this map it appears there is some concentration of the energy sector in the southern portion of the state, but there are still several parishes in the northern and central regions with 500 or more energy employees. For example, Caddo Parish employed 3,184 people in these three industries, while Bossier Parish employed 2,230.

Map 1
Distribution Across Louisiana Parishes of Covered Employment in the Oil & Gas Extraction, Refining, Pipeline, and Support Activities for Mining Industries : 2010



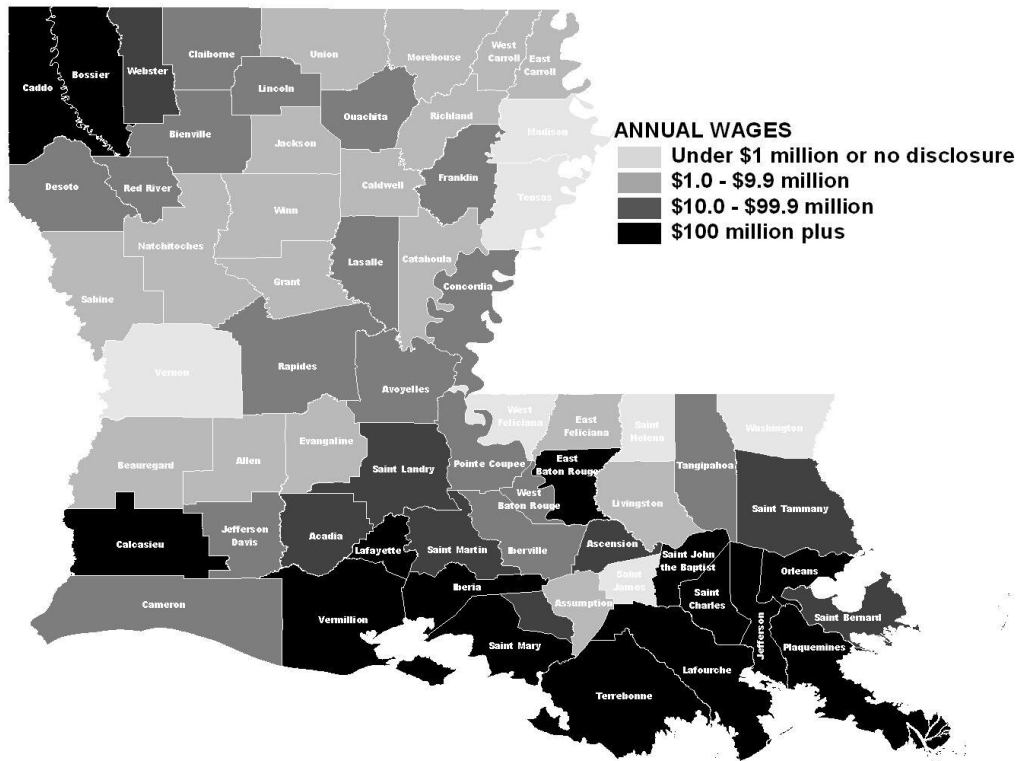
Distribution across the State: Annual Wages

The last column of Table 6 contains annual covered wage data by parish. Map 2 provides a visual illustration of the distribution of covered wages. These data detail what is in some cases a massive injection of earnings into a parish's economy. Note for example that in 2010-II:

- There were 53 parishes where energy wages exceeded \$1 million a year.
- There were 13 parishes where energy wages exceeded \$100 million.
- In Lafayette Parish energy wages exceeded \$1 billion dollars, and in Orleans and Terrebonne Parishes, annual energy wages totaled over \$350 million dollars.

Clearly, the energy sector is vitally important to the economic health of these parishes. It is also important to note that these are only the **direct** effects of the energy sector on these economies. They do not include the additional multiplier or spillover effects that will be estimated later in this report.

Map 2
Distribution Across Louisiana Parishes of Covered Wages Earned in the Oil & Gas Extraction, Refining, Pipeline, and Support Activities for Mining Industries : 2010



A Broader Income Measure: Value Added

Care has been taken in the material above to describe the wage data as pertaining to covered employment in the three energy industries. While this measure will fairly comprehensively include most wage and salary workers, it will not include wages and salaries paid to self employed individuals or unpaid family members---probably a small set within total wage and salary workers in these industries.

However, it is important to realize that wages and salaries are only one component of the income generated for Louisiana citizens by these industries. Not included in the tables above are other labor income, rental incomes, profits, and interest earnings.

One of the best measures of the **total income** created by an industry is its **value added**. Unfortunately, value added data by industry are rather scarce. One useful source is the various industrial censuses and surveys that are taken by the U.S. Bureau of the Census. The Bureau of the Census conducted an **Annual Survey of Manufactures** in 2009 which provides value added data for all of the state's manufacturing sectors for that year. Unfortunately, the Bureau does not conduct an annual survey of the mining sector. The agency does conduct a census of the mining sector every five years. The latest of these censuses is the Louisiana **Census of Mineral Industries: 2007**. Unfortunately, though there is a census of transportation specifically for Louisiana, value added data are not provided specifically for the pipeline industry.

Value added data for Louisiana's manufacturing industries and its extraction sector are provided in Table 7. Note that the manufacturing data are for 2009 and the oil and gas extraction data are for 2007. Without question comparable 2009 oil and gas extraction value added data would

be much higher than the 2007 figure shown in Table 7 because of the very large increase in oil and natural gas prices that occurred between 2007 and 2009 and the development of the huge Haynesville Shale play in northwest Louisiana.

Table 7

Value Added in Louisiana Manufacturing Sectors in 2009
And in Support Activities for Mining & Oil and Gas Extraction in 2007

Sector	Value Added (Millions)	Percent of Manufacturing Total
Chemicals	16,993.4	40.6
Petroleum & Coal Products	\$11,449.00	27.4
Paper Manufacturing	2,340.5	5.6
Fabricated Metals	2,302.7	5.5
Food Manufacturing	2,237.6	5.4
Transportation Equipment	1,948.7	4.7
Machinery Manufacturing	1,195.9	2.9
Nonmetallic Mineral Products	635.0	1.5
Plastics & Rubber Products	536.8	1.3
Wood Products	486.9	1.2
Primary Metals	428.3	1.0
Printing & Related Products	218.2	0.5
Beverage & Tobacco	170.0	0.4
Electrical Equipment	168.1	0.4
Textile Products	D	NA
Apparel Manufacturing	D	NA
Computers & Electronics	D	NA
Total Manufacturing	\$41,820.0	100
Oil & Gas Extraction*	\$34,782.7	NA
Support Activities for Mining*	8,114.1	NA

Source: 2009 Survey of Manufactures, U.S. Bureau of Census and 2007 Economic Census for Louisiana: Mining. D = not shown due to disclosure rules. NA = Not Applicable. *Data are for 2007. The petroleum & coal products sector is 98 percent refining and support activities for mining is 99.9 percent associated with the oil and gas extraction sector.

There are several striking conclusions that arise from examining these data.

- Note in the bottom line of Table 7 **that in 2007 nearly \$43 billion in income was created by Louisiana's oil and gas extraction sector and its associated "support activities for mining" sector.** This figure exceeds that of each manufacturing sector in Louisiana, the sum of all manufacturing sectors in the state, and this figure occurred two years earlier than the manufacturing data in Table 7.
- **With nearly \$11.5 billion in value added, petroleum refining is the second largest source of income in Louisiana's manufacturing sector.** Indeed, over one-quarter (27.4 percent) of Louisiana's value added in manufacturing is derived from the refining sector.
- We estimate that combining these two time periods, **the oil and gas industry and the refining sectors combined created a remarkable \$54.3 billion of income in Louisiana.**

The Impact of the "Great Recession"

We should point out one other important fact about the data in Table 7. Though the numbers for the value added in the refining sector are quite impressive, it is important to note that the data in Table 7 for the manufacturing sector are for 2009, the trough year for the "Great Recession"---the worst recession the economy has suffered since the Great Depression. The result is that the value added for the refinery sector is seriously lower than what it is during more normal times.

For example, in our previous report we used data for the 2005 Annual Survey of Manufactures, and that report indicated the value added in the refining sector was (1) \$34.3 billion---three times higher than in 2009 and (2) refining was by far the largest contributor to manufacturing value added in Louisiana---\$13 billion higher than #2 chemicals. Our point is that **when the national economy returns to a more sustained growth mode, the value added in refining in**

Louisiana will surely rise dramatically and be much higher than the still impressive \$11.5 billion number shown in Table 7.

III. Indirect or Multiplier Effects of the Industry

Earlier in this report it was mentioned that a helpful way to think of the energy sector's impact on the Louisiana economy was to think of the state as one large economic pond. Into this pond a rock is dropped labeled "energy industries". Section II of this report has provided estimates of the effect on the state of the initial splash made when the rock hit the pond---what has been referred to as the **direct** impacts of the industry.

Ripples in the Pond: The Multiplier Effect

However, when this rock hits it will also send out ripples to the edge of the pond---what are called the **multiplier** or indirect effects of the industry. For example, the extraction industry will order offshore platforms from Louisiana fabricators such as J. Ray McDermott or Gulf Island Fabricators. This creates sales, income, and jobs in those firms, which in turn call their suppliers and order sheet steel, pipes, electrical generators, etc., which creates sales, income, and jobs in those firms, and so on. The employees that are hired in the extraction industry are paid wages and salaries which they then spend at car dealerships, grocery stores, eating establishments, etc., which generates new sales, income, and jobs there, etc., etc.

As it turns out, there is a useful tool for measuring these multiplier effects for the industries. It is called an **input-output (I/O) table**. Such a table has been constructed for the Louisiana economy by the Bureau of Economic Analysis (BEA) in the U.S. Department of Commerce. The

BEA is the same governmental agency that is responsible for tabulating the gross domestic product statistics that are released on the economy quarterly.

To use the I/O tables we went to the 2009 Louisiana gross state product (GSP) statistics provided by the BEA. The BEA estimated the contribution made by the oil and gas exploration industry, the refining industry and the pipeline industry to state GSP. These were the figures we inserted into the I/O tables. (Pipeline data were only available for 2008, so we extrapolated a trend line to estimate pipeline's contribution in 2009.) The multiplier effects on business sales, household earnings, and jobs in Louisiana are documented for the oil and gas extraction sector in Table 8, for the refining sector in Table 9 and for the pipeline industry in Table 10.

Ripple Effects of the Extraction Industry

Table 8 contains the estimated multiplier effects of the extraction industry from the I/O table. The I/O table enables one to estimate the impact of an industry on three key variables in the state: (1) sales at firms; (2) household incomes; and (3) jobs.

Any question about whether or not the extraction industry is a weak or strong engine for economic activity in Louisiana should be completely answered by the numbers in this table. By any reasonable measure, these spillover impacts are huge. **According to the I/O table, extraction industry activity in 2009 created nearly \$43.3 billion in sales at Louisiana firms.**

Table 8 provides details on how these sales are distributed across firms in different industries. The greatest beneficiary is the crude petroleum and natural gas industry---where the "rock" is, so to speak. But notice that multi-millions of dollars in sales are enjoyed by firms in many other sectors of the Louisiana economy. The **real estate industry** does particularly well (\$4.0 billion) not only

because the earnings created by this industry allows Louisianans to purchase homes and boosts the demand for shopping centers and other business establishments, but also because the extraction industry purchases a lot of property for drilling and production purposes. Over one billion dollars in sales are created in each of the following industries: manufacturing (\$2.3 billion), professional/technical/scientific services (\$1.4 billion), management of companies & enterprises (\$1.1 billion), health care (\$1.2 billion), retail trade (\$1.1 billion), and construction (\$1.1 billion).

Table 8
Direct and Multiplier Effects of Oil and
Gas Extraction Sector: 2009

Category	Business Sales (Millions)	Earnings (Millions)	Jobs
Agriculture, forestry, fishing, and hunting	\$132.3	\$22.0	1,032
Mining	\$21,456.0	\$4,356.0	40,976
Utilities	\$705.5	\$142.2	1,705
Construction	\$1,024.7	\$383.1	10,643
Manufacturing	\$2,309.7	\$436.3	8,010
Wholesale trade	\$797.0	\$252.3	4,754
Retail trade	\$1,136.5	\$394.2	17,024
Transportation and warehousing	\$656.6	\$207.1	4,735
Information	\$508.6	\$113.3	2,448
Finance and insurance	\$960.2	\$262.0	6,081
Real estate and rental and leasing	\$3,985.4	\$385.3	

			9,205
Professional, scientific, and technical services	\$1,378.7	\$629.4	11,323
Management of companies and enterprises	\$1,095.8	\$452.8	7,880
Administrative and waste management services	\$471.3	\$205.0	10,039
Educational services	\$141.8	\$58.3	2,521
Health care and social assistance	\$1,208.6	\$567.3	15,544
Arts, entertainment, and recreation	\$120.1	\$46.4	2,071
Accommodation	\$155.1	\$46.8	1,710
Food services and drinking places	\$460.3	\$145.8	10,088
Other services*	\$570.0	\$176.3	7,061
Households		\$13.1	1,503
Totals	\$39,274.3	\$9,294.9	176,352

Source: Louisiana Input-Output Table, Bureau of Economic Analysis, U.S. Department of Commerce, Washington, D.C.

For most citizens, the key numbers in Table 8 are the ones in the middle column---the ones dealing with household income. **According to the I/O table, the extraction industry pumped nearly \$9.3 billion into the bank accounts of Louisiana citizens in 2009.** Persons that worked in the extraction industry earned the biggest fraction of this money---nearly \$4.4 billion---but note that there were 16 sectors of the economy where household earnings exceeded \$100 million in 2009. Employees in the health services sector were the second largest gainers (\$567.3 million), followed by professional, technical, and scientific workers (\$629.4 million) and employees in management of companies & enterprises (\$452.8 million).

Finally, the last column of Table 8 provides the jobs impact of the oil and gas extraction sector. Here, the numbers are particularly impressive. According to the I/O table **a total of 176,352 jobs in Louisiana in 2009 could be traced directly or indirectly to the presence of the extraction industry**. Not surprisingly, the bigger impacts again are in the principal industry---extraction (40,976 jobs)---which includes the direct job impacts as well. **This implies a job multiplier for this industry of 3.72**. That is, for every new job created in this sector, there are 2.72 jobs created in other sectors of the Louisiana economy via the multiplier effect.

But notice that thousands of jobs are supported in many other sectors of the Louisiana economy because of extraction's presence here. The retail trade and health care sectors especially benefit from these spillover impacts with 17,024 and 15,554 jobs created, respectively. In excess of 10,000 jobs are supported in each of the following industries: professional/technical/scientific services (11,323), construction (10,643), food services (10,088), and administrative and waste management services (10,039).

It is also interesting to note two other factors regarding the numbers in Table 8. First, the jobs created both directly and indirectly via the multiplier effect from the oil and gas industry are particularly high paying jobs. They average **\$52,707 a year** (\$9,294.9 million divided by 176,352). By way of comparison, the average annual wage in all sectors of the Louisiana economy is right at \$40,000 (see Table 5).

Secondly, a careful reader will discover that the business sales and employment numbers along the bottom line of Table 8 are smaller than in our 2005 study. There are two reasons for that phenomenon. First, natural gas prices in 2009 (\$3.90 per mmbtu) were less than half that of 2005

(\$8.66 mmbtu). Secondly, the annual average rig count in Louisiana in 2009 (150) was lower than in 2005 (182).

Ripple Effects of the Refining Industry

The existence of a mother lode of petroleum beneath our borders, and beneath the waters in our coastal Gulf of Mexico, has attracted to Louisiana an industry that operates immediately downstream from oil and gas production---**refineries**. Table 9 contains the I/O estimates of the spillover effects of this industry. It is important to note that we were careful not to double count the impact of this industry by including the extraction sector effects. That is why the “mining” sector in Table 9 contains zeros.

Table 9

Direct and Multiplier Effects of the Refinery Sector in Louisiana: 2009

Category	Sales	Earnings	Jobs
Agriculture, forestry, fishing, and hunting	\$78.4	\$13.1	623
Mining	0	0	0
Utilities*	\$877.3	\$163.3	1,973
Construction	\$594.3	\$222.0	6,175
Manufacturing	\$24,941.9	\$2,977.9	26,121
Wholesale trade	\$1,003.5	\$317.8	5,987
Retail trade	\$968.7	\$335.2	14,527
Transportation and warehousing*	\$1,166.8	\$328.7	6,360
Information	\$370.1	\$82.7	1,797
Finance and insurance	\$635.6	\$169.8	3,886
Real estate and rental and leasing	\$2,248.6	\$182.9	5,238
Professional, scientific, and technical services	\$759.7	\$363.5	6,612
Management of companies and enterprises	\$709.6	\$293.9	5,110
Administrative and waste management services	\$444.1	\$189.4	9,455
Educational services	\$115.4	\$47.9	2,072
Health care and social assistance	\$990.5	\$465.8	12,732
Arts, entertainment, and recreation	\$95.8	\$37.0	1,658

Accommodation	\$121.9	\$37.0	1,340
Food services and drinking places	\$398.4	\$126.3	8,758
Other services*	\$550.7	\$169.8	6,600
Households		\$10.9	1,235
Totals	\$37,071.2	\$6,534.8	128,259

Source: Louisiana Input-Output Table, Bureau of Economic Analysis, U.S. Department of Commerce, Washington, D.C.

Note the bottom line of the first column of Table 9. **The existence of the refining industry in Louisiana created \$37 billion in sales at Louisiana firms in 2009.** Clearly, this industry has had a very powerful economic effect on the Louisiana economy. Almost two-thirds of these sales (\$24.9 billion) occurred in the manufacturing sector---a sector which includes the refinery sales in that year associated with "dropping the rock in the pond".

There were three other sectors where over \$1 billion in sales could be traced back to the refining industry: real estate (\$2.2 billion), transportation & warehousing (\$1.2 billion), and wholesale trade (\$1.0 billion). The transportation sector is a big winner, because that sector includes the pipeline industry, the next immediate downstream step in getting the refined product to the market. Note that there are eight other sectors of the Louisiana economy where businesses can track over one-half billion in annual sales back to the presence of the refinery industry.

Column two of Table 9 reveals the impact of the refining industry on household incomes of Louisianans in 2009. **Over \$6.5 billion in earnings were injected into the Louisiana economy through both the direct and indirect effects of the refining industry in that year.** That is about 3.8 percent of Louisiana's \$169 billion in personal income earned in that year.⁹ Almost \$3 billion of this income went to workers in the manufacturing sector where the refineries are located. Note that

there were 13 other sectors in Louisiana that saw their workers' earnings boosted in excess of \$100 million in 2009 through spillover effects of the refining industry.

The jobs impacts were equally impressive. According to the last column in Table 9, **there were 128,259 jobs in Louisiana in 2009 that could be traced directly or indirectly to the refining industry**. Some 26,121 of those jobs were in the manufacturing sector, which includes the direct jobs in the refining industry. In excess of 10,000 jobs were supported in retail trade (14,527) and health care (12,732), with the administrative and waste management service sector coming close to the 10,000 mark with 9,455 jobs traceable to the refining industry. There were nine other sectors where more than 5,000 jobs were related to refining activities in 2009.

Those familiar with input-output multiplier estimates may raise their eyebrows at the size of the total employment effect of the refining sector of 128,256 jobs. Back in Table 4, we reported Louisiana Workforce Commission estimates of 11,567 people employed at the state's refineries. This implies a job multiplier of **11.1**---a number so high that one might question the credibility of the estimate.

However, there are two nuances about this industry that lend credence to the job multiplier estimate. First, the 11,567 in direct employment is the number of people working for the refinery owners, like Citgo, ConocoPhillips, ExxonMobil, etc. In reality, the number of people working at a refinery is much larger than the direct payroll of these firms because a significant amount of work---especially maintenance and repairs---is subcontracted to other firms.

Secondly, and more importantly, because our input into the I/O table was the value added by the industry, it includes capital construction expenditures by the refining sector. As it turns out, in

2009 this number was a massive **\$2.9 billion** according to our survey of this industry. Partly this was due to a very large expansion at one site and partly it was due to expenditures to produce lower sulfur-content diesel. Using I/O table analysis, we estimate that these capital expenditures were responsible for 55,840 of the jobs listed at the bottom of Table 9. Taking out these jobs alone, means the multiplier effect for the refining industry is about **6.3**---a relatively high figure, but not unreasonable for a very capital-intensive industry like refining.

Ripple Effects of the Pipeline Industry

As mentioned in the introductory section of this report there are approximately 125,000 miles of pipelines crisscrossing Louisiana, vividly shown back in Figure 1. The industry directly supports 2,611 jobs and generates over \$203 million in wages and salaries for its employees. The I/O table estimates of the total impact of the industry are shown in Table 10.

Table 10

Direct and Multiplier Effects of the Pipeline Sector in Louisiana: 2009

Category	Output	Earnings	Jobs
Agriculture, forestry, fishing, and hunting	\$2.6	\$0.4	20
Mining	0	0	0
Utilities*	\$17.2	\$3.5	41
Construction	\$29.6	\$11.1	308
Manufacturing	\$109.3	\$17.5	286
Wholesale trade	\$26.8	\$8.5	160
Retail trade	\$32.4	\$11.2	486
Transportation and warehousing*	\$451.5	\$97.7	1,288
Information	\$14.2	\$3.1	67
Finance and insurance	\$29.4	\$8.0	180
Real estate and rental and leasing	\$51.9	\$3.3	159
Professional, scientific, and technical services	\$59.1	\$27.3	493

Management of companies and enterprises	\$6.9	\$2.9	50
Administrative and waste management services	\$38.0	\$18.8	931
Educational services	\$3.8	\$1.6	68
Health care and social assistance	\$32.1	\$15.1	413
Arts, entertainment, and recreation	\$3.0	\$1.2	52
Accommodation	\$3.9	\$1.2	43
Food services and drinking places	\$12.1	\$3.9	267
Other services*	\$21.3	\$6.6	253
Households		\$0.3	40
Totals	\$945.2	\$243.1	5,606

The mass of pipelines shown in Figure 1 should have been a sort of early warning signal that this industry's impact---though not as large as extraction and refining---is still non-trivial. According to the I/O table, the pipeline industry was responsible for almost \$1 billion in sales at Louisiana businesses, almost a quarter of a billion dollars in earnings for Louisiana households, and 5,606 jobs for Louisianans.

The Total Impact: More than "Ripples"

A large number of figures are contained in Tables 8, 9 and 10. Table 11 presents a handy summary of the bottom line from those three tables. According to the I/O table, **the energy industry in Louisiana supports \$77.3 billion in sales at firms in the state, over \$16 billion in household earnings for Louisianans, and 310,217 jobs.** The term "ripple" hardly does justice to the magnitude of these impacts. These are more like small waves.

Table 11

Summary of Input-Output Results Across
Industries: 2009

Industry	Direct and Multiplier Effects on:		
	Sales (millions)	Household Income (millions)	Jobs
Oil & Natural Gas Extraction	\$39,274.3	\$ 9,294.9	176,352
Refineries	37,071.2	6,534.8	128,259
Pipelines	945.2	243.1	5,606
Totals	\$77,290.7	\$16,072.8	310,217

Source: Louisiana Input-Output Table

Numbers in the billions are used so frequently in society today that it is difficult to get a grasp on what they really mean. Table 11 shows that the industry created \$16.1 billion in household earnings in 2009. Perhaps a few comparisons will put these numbers in perspective.

- That is 13.6 percent of the total earnings of Louisianans in that year.¹⁰
- This number exceeds the total earnings of persons in each of every single parish in the state in 2008 (latest year available). The parish that came closest to matching this total was East Baton Rouge Parish at \$15.5 billion.¹¹
- The World Bank has generated a table listing the gross domestic product (GDP) of 185 countries in the world in 2009.¹² Eighty six of those countries have gross domestic products smaller than \$16.1 billion.

Table 10 shows that the jobs of 310,217 Louisianans are dependent on the presence of the energy industry in this state. By way of reference:

- This number represented 16 percent of non-agricultural wage and salary employment in 2009 in Louisiana.¹³
- Recall from Table 4 that 62,417 people are employed directly in the energy industries in the state. **This means the job multiplier for these three industries is 5.0**, a figure which includes the direct jobs. **This means for each job created in these three industries, 4.0 additional jobs are created elsewhere in the state.**

What these numbers reveal is that the economic impact of the energy industry is both huge and widespread. Clearly, it has been a powerful influence for economic growth in Louisiana.

IV. Tax Impacts of the Energy Industry

Our analysis of the employment and earnings impacts of these energy industries reveals an economic engine with extensive job and income creating powers. It should come as no surprise then

that both state and local governments enjoy a nice boost to their treasuries from the presence of the extraction, refining and pipeline industries in our state.

These industries influence tax payments to these two governmental units in two ways. First, there are the taxes paid **directly** by the industry to state and local governments in the form of corporate income and franchise taxes, sales taxes, royalties, rentals, bonuses, property taxes, fees, etc.

However, there is a second major source of revenues generated by the industries' presence---**indirect taxes**. Recall that in section III, it was determined that \$16.1 billion in household earnings was created in the state both directly and through the multiplier effects of these industries' activities (see Table 11). State and local governments collect additional taxes via these earnings as well.

Direct State Taxes

Table 12 documents the direct state taxes and fees paid by the extraction, refining, and pipeline industries in fiscal year 2009-10 (FY10). **The energy industry paid \$1,384,600,000 in state taxes in FY10 or about 15.5 percent of total taxes, licenses, and fees collected by the state.**

Clearly, if this sector did not exist in Louisiana, our citizens would be able to do far less in terms of infrastructure, education, care for the poor, etc., than it is doing today. One point four billion dollars can correct a lot of social problems.

Table 12
Direct State Taxes Collected From Oil & Gas Extraction, Refining,
And Pipeline Industries: Fiscal Year 2009-10

Tax Category	Taxes Paid Millions of Dollars
Severance Taxes	\$777.5
Royalties, Rentals, Bonuses, Leases	470.0
Corporate Income & Franchise & Sales Taxes	94.6
Direct Fees to Dept. of Natural Resources	11.3
Royalties Paid to 8g Fund	21.0
Fees Paid to Dept. of Environmental Quality	10.2
TOTAL DIRECT TAXES PAID	\$1,384.6
Total State Taxes, Licenses & Fees	\$8,919.9
Total Direct Taxes as Percent of Total State Taxes, Licenses, Fees	15.5%

Source: Departments of Revenue, Environmental Quality, Natural Resources, and Legislative Fiscal Office. Total State Taxes, Licenses, and Fees do not include some agency receipts included in direct taxes paid by the industry.

By far the largest portion of these tax collections are mineral taxes and payments such as severance taxes, royalties, rentals, and bonuses. Counting payments to the 8g fund, these mineral taxes totaled nearly \$1.3 billion or 92 percent of total direct taxes paid by this sector. The next biggest set of taxes was the corporate franchise and income taxes and sales taxes which came to \$94.6 million in FY10. Note that this latter number was held down in FY10 by the fact that the U.S. economy was in the very trough of the "Great Recession" at that time, which held down corporate income tax collections.

Ad Valorem Taxes to Local Governments

From data tabulated by the Louisiana Tax Commission it is possible to derive a very conservative estimate of the property taxes collected from the energy industries by local governments in Louisiana. The phrase "very conservative" was used in that last sentence because the Tax Commission has reliable data on the assessed value of pipelines, drilling rigs, oil and gas surface equipment, and oil and gas wells from which property tax payments can be derived. In addition, a survey was conducted of the 16 largest refineries in the state to obtain their property tax payments in 2009.

However, what is not available are data on the assessed value of business furniture and fixtures, leased equipment, buildings and land, machinery and equipment owned, and inventories in all of the pipeline and extraction companies. This would no doubt be quite a large figure. Because these items cannot be isolated from the Tax Commission data, our property tax numbers for the industry will be at the very lower limit of total property taxes paid.

Table 13 contains a wealth of data on ad valorem taxes paid in Louisiana. This table shows total ad valorem taxes paid, our very conservative estimate of taxes paid by the extraction, refining, and pipeline industries, and what percent of total ad valorem taxes in each parish was paid by these three energy industries.

Table 13

Ad Valorem Taxes Paid by Parish and Amount Paid
By Oil & Gas, Refining, and Pipeline Industries: 2009

Parish	Ad Valorem Taxes	Taxes Paid by Oil/Gas Refining, & Pipelines	Percent of Total Paid by Oil/Gas Refining, Pipelines
Acadia	\$ 20,285,768	\$3,733,830	18.4
Allen	\$ 11,668,018	1,029,307	8.8
Ascension	\$ 87,539,910	7,935,969	9.1
Assumption	\$ 12,410,816	1,203,204	9.7
Avoyelles	\$ 5,622,024	122,250	2.2
Beauregard	\$ 20,132,473	2,279,270	11.3
Bienville	\$ 31,665,405	9,992,339	31.6
Bossier	\$ 79,211,164	13,774,213	17.4
Caddo	\$ 198,286,938	10,643,588	5.4
Calcasieu	\$ 156,457,843	19,848,820	12.7
Caldwell	\$ 5,636,564	1,037,927	18.4
Cameron	\$ 38,172,064	10,255,253	26.9
Catahoula	\$ 3,177,740	77,550	2.4
Claiborne	\$ 10,802,533	3,657,734	33.9
Concordia	\$ 12,504,099	199,902	1.6
Desoto	\$ 41,666,365	16,940,232	40.7
E. Baton Rouge	\$ 360,853,432	17,408,756	4.8
E. Carroll	\$ 3,888,554	0	0.0
E. Feliciana	\$ 5,155,647	69,033	1.3
Evangeline	\$ 10,886,148	1,264,516	11.6
Franklin	\$ 5,080,474	176,439	3.5
Grant	\$ 6,569,459	121,181	1.8
Iberia	\$ 31,851,715	2,764,104	8.7
Iberville	\$ 41,371,373	1,571,556	3.8
Jackson	\$ 18,882,513	10,090,048	53.4
Jefferson	\$ 312,030,421	2,417,414	0.8
Jefferson Davis	\$ 17,338,485	2,739,640	15.8
Lafayette	\$ 135,015,309	1,146,932	0.8
Lafourche	\$ 80,369,175	12,088,215	15.0
LaSalle	\$ 10,754,604	1,615,449	15.0
Lincoln	\$ 30,446,559	4,557,431	15.0
Livingston	\$ 44,585,194	308,250	0.7
Madison	\$ 9,993,506	0	0.0
Morehouse	\$ 11,720,890	244,528	2.1
Natchitoches	\$ 19,557,834	161,493	0.8
Orleans	\$ 408,721,072	0	0.0

Ouachita	\$ 81,011,017	727,418	0.9
Plaquemines	\$ 55,879,673	23,683,948	42.4
Pointe Coupee	\$ 16,770,786	2,262,165	13.5
Rapides	\$ 68,162,968	1,606,785	2.4
Red River	\$ 8,048,692	2,758,876	34.3
Richland	\$ 10,161,546	307,896	3.0
Sabine	\$ 8,569,592	380,723	4.4
St. Bernard	\$ 29,878,748	11,800,078	39.6
St. Charles	\$ 120,107,171	18,978,089	15.8
St. Helena	\$ 4,910,568	378,034	7.7
St. James	\$ 42,551,374	13,755,459	32.3
St. John	\$ 41,429,136	15,729,798	38.0
St. Landry	\$ 28,238,290	1,359,865	4.8
St. Martin	\$ 23,548,985	2,684,235	11.4
St. Mary	\$ 49,090,786	5,987,770	12.2
St. Tammany	\$ 224,332,278	0	0.0
Tangipahoa	\$ 38,776,627	155	0.0
Tensas	\$ 4,366,189	250,519	5.7
Terrebonne	\$ 69,262,486	14,709,801	21.2
Union	\$ 8,790,791	1,068,559	12.2
Vermillion	\$ 29,210,985	7,169,713	24.5
Vernon	\$ 13,408,772	2,959,116	22.1
Washington	\$ 17,652,702	51,392	0.3
Webster	\$ 22,340,838	5,587,804	25.0
W. Baton Rouge	\$ 26,404,577	2,109,276	8.0
W. Carroll	\$ 3,581,616	0	0.0
W. Feliciana	\$ 19,171,649	19,529	0.1
Winn	\$ 6,096,458	185,319	3.0
Total	\$ 2,965,346,352	\$297,988,697	10.0

Source: Louisiana Tax Commission Annual Report, 2009 & industry survey. Taxes paid by Chalmette Refinery in St. Bernard Parish not included.

According to these data:

- The extraction, refining, and pipeline industries **paid right at \$298 million in ad valorem taxes to local governments in 2009**---a 72.6 percent increase over the 2005 number we reported in our last impact study.
- In 41 of the 64 parishes, ad valorem taxes paid by the industries exceeded \$1 million. In 18 parishes, the figure exceeded \$5 million.

- The distribution of high-tax-collection parishes for these industries correlates closely with the distribution of earnings and employment shown back in Maps 1 and 2.
- **Plaquemines Parish, with both refineries and huge exploration activities, was in the top spot in total taxes paid at \$23.7 million.** The next five highest ranked parishes---Calcasieu, St. Charles, East Baton Rouge, St. John the Baptist, St Bernard, and St. James---also contain large refineries. These very capital intensive industries have an abundance of property subject to the ad valorem tax.
- **A total of 10.0 percent of property taxes collected by local governments in 2009 came from the energy sector.** Clearly, local governments are getting even more dependent on the energy sector for property taxes since this number was 5.7 percent in 1999 and 7.1 percent in 2005.
- It is apparent from the numbers in the last column of Table 13 that some parishes would face some very serious financial problems if for some reason these energy industries vanished from their borders. There were 29 parishes where over ten percent of property taxes came from the energy sector, and there were 12 parishes where energy sector property taxes made up a quarter of property taxes collected.

The Haynesville Play Effect. What is not readily apparent from the data in Table 13 is the impact on certain local governments of the new **Haynesville Shale play** in northwestern Louisiana. This new play did not really become a serious factor in the economy until late 2008 when a great deal of money was spent buying mineral leases in the area. Since then there has been a boom in exploration in the play. In Table 14 we show the amount of energy-related property taxes collected

in certain northwestern parishes in 2005 versus 2009. These data demonstrate the dramatic impact this play had on local governments in this region.

Table 14

Energy-Related Property Tax Collections in Northwestern Parishes:

2005 Versus 2009

Parish	Property Taxes 2005	Property Taxes 2009	% Energy- Related 2005	% Energy- Related 2009
Desoto	\$22,395,351	\$41,666,365	18.9%	40.7%
Red River	\$3,549,617	\$8,04,692	3.6%	34.3%
Webster	\$15,728,690	\$22,340,838	17.1%	25.0%
Bossier	\$52,449,881	\$79,211,164	8.5%	17.4%
Caddo	\$158,347,601	\$198,286,938	2.8%	5.4%

Especially note the huge increase in property tax collections in Red River Parish----where they more than doubled---and in Desoto Parish where they almost doubled. And these increases occurred right in the middle of the "Great Recession". This new play dramatically enhanced the budgetary situations of these parishes.

The Industrial Tax Exemption. Some readers may be surprised at the numbers back in Table 13. They believe that the 10-year industrial tax exemption (TYITE) protected these industries from paying much in the way of property taxes. First of all, the TYITE applies for the most part

only to **manufacturing firms**. Thus, while it would apply to refineries, it is not available to pipelines or to the extraction industry.

Secondly, it is a **ten year** exemption. At the end of that 10-year period, the property rolls off the exemption schedule and onto the taxable rolls. Table 15 provides data by parish on the value of TYITE in force as of December, 2010 and the portion of that which applies to refineries. Of the \$48.4 billion in exemptions in force as of that date, about \$8.4 billion, or 17.4 percent of the total, was for refineries.

Table 15

Total Value of 10-Year Industrial Tax Exemptions in Force in 2010, Value for Refineries, and Amount of Refinery Exemptions Expiring over 2011-15

Parish	Investment	Oil Refining Contracts	Oil Refining Contracts
	In Force 2010	In Force 2010	Expiring 2011-2015
Acadia	\$665,094,827		
Allen	\$305,509,314		
Ascension	\$4,223,213,677		
Assumption	\$89,535,221		
Avoyelles	\$11,110,960		
Beauregard	\$288,938,813		
Bienville	\$114,655,707		
Bossier	\$74,675,975	\$17,288,501	\$5,269,303
Caddo	\$2,549,065,865	\$544,295,011	\$69,000,906
Calcasieu	\$3,646,092,693	\$652,300,411	\$533,065,577
Caldwell	\$115,755		
Cameron	\$2,303,486,507		
Catahoula	\$159,947		
Concordia	\$16,936,617		
DeSoto	\$280,756,419		
East Baton Rouge	\$3,387,224,018	\$844,543,267	\$395,914,542

East Carroll	\$773,204		
East Feliciana	\$1,250,139		
Evangeline	\$335,478,728		
Franklin	\$2,128,959		
Grant	\$6,444,924		
Iberia	\$134,559,503		
Iberville	\$3,915,939,727		
Jackson	\$28,825,035		
Jefferson	\$624,926,027		
Jefferson Davis	\$174,570,747		
LaSalle	\$2,359,713		
Lafayette	\$231,843,273		
Lafourche	\$136,852,488		
Lincoln	\$283,907,093		
Livingston	\$46,971,145		
Madison	\$1,093,252		
Morehouse	\$164,374,339		
Natchitoches	\$489,596,218		
Orleans	\$528,369,075	\$1,027,461	\$1,027,461
Ouachita	\$2,150,264,025		
Plaquemines	\$699,078,197		
Pointe Coupee	\$217,948,512		
Rapides	\$1,773,645,106		
Red River	\$7,563,767		
Richland	\$137,779,150		
Sabine	\$54,338,583		
St. Bernard	\$831,952,223	\$545,987,737	\$262,814,832
St. Charles	\$4,348,492,642	\$1,014,064,732	\$75,711,310
St. Helena	\$28,781,708		
St. James	\$3,360,549,782		
St. John the Baptist	\$5,015,546,290	\$4,620,281,638	\$484,025,367
St. Landry	\$159,116,202	\$95,818,722	\$13,640,239
St. Martin	\$89,012,553		
St. Mary	\$484,975,126		

St. Tammany	\$56,097,499		
Tangipahoa	\$129,039,115		
Terrebonne	\$250,228,076		
Union	\$23,749,982		
Vermilion	\$21,131,617		
Vernon	\$3,634,143		
Washington	\$75,320,837		
Webster	\$85,513,453	\$10,341,367	\$7,703,626
West Baton Rouge	\$2,940,727,304	\$28,204,406	\$15,581,274
West Carroll	\$768,835		
West Feliciana	\$315,555,077		
Winn	\$56,738,651		
State Totals	\$48,384,384,359	\$8,374,153,253	\$1,863,754,437

Source: Louisiana Department of Economic Development

The last column of Table 15 indicates that exemptions on nearly \$1.9 billion of refinery property will expire over the five-year period from 2011-15. Calcasieu Parish, in particular, will experience a taxable property bonanza during this period as over \$533 million in refinery property becomes taxable. St. John the Baptist is next at nearly one half billion dollars (\$484 million), followed by East Baton Rouge Parish at over \$395.9 million dollars in new property that will come on the taxable rolls over 2011-14. In St. Charles Parish the figure is approximately one-quarter of a billion dollars (\$262.8 million).

The local taxes paid by these three energy industries that are listed in the third column of back in Table 13 are very conservative for two reasons. They include only **parish** property taxes. They do not include (1) **municipal property taxes** nor (2) **local sales taxes** paid by these industries when they buy products in the parishes. Unfortunately, neither of these taxes paid to local governments are tabulated by industry group.

Indirect Taxes Generated

The taxes detailed in Tables 12-13 are only those for which firms in these industries have to write out a check. But the presence of the extraction, refining, and pipeline industries generated \$16,072,800,000 in household earnings in 2009 through both the direct salaries paid and indirect earning produced through the multiplier effects (see Table 11). These earnings are subject to the state income tax. When spent, these household earnings generate gasoline taxes, sales taxes (both state and local), beer/soft drink/tobacco taxes, etc.

According to the Legislative Fiscal Office, the state of Louisiana collects seven cents in revenues (excluding mineral revenues) for every dollar earned by households in the state. **Thus the extraction, refining, and pipeline industries---through the direct and indirect creation of household earnings---were responsible for generating an estimated \$1,125,096,000---over a billion dollars---in tax collections for the state of Louisiana in FY10.**

What about local taxes paid via these household earnings? Local governments collect approximately 4.4 cents for every dollar earned by a Louisiana household. **Thus, the \$16.1 billion in household earnings generated by the three energy industries through direct and multiplier effects added approximately \$707,203,200---nearly three-quarters of a billion dollars---to the coffers of local governments in FY10.**

Total Taxes Generated

A lot of ground has been covered to this point in documenting the amount of taxes---both directly and indirectly---generated by these three energy-related sectors. Table 16 handily summarizes our findings.

Table 16

Total State and Local Taxes Generated by the Energy Sector: FY10
(Millions)

Tax Source	State Government	Local Government
Direct	\$1,384.6	\$298.0
Indirect	1,125.1	707.2
Total	\$2,509.7	\$1,005.2

The numbers are eye-popping, but not unexpected given our documentation of the size of this sector of the Louisiana economy. **In FY10, \$2.5 billion of state government revenues can trace their origins back to the energy sector. For local governments, over a billion dollars were pumped into their treasuries in FY10 due to the presence of this industry.**

State and local tax dollars in Louisiana support a wide variety of social goods and services, such as elementary, secondary, and higher education, highways, the charity hospital system, economic development efforts, tourism promotion, public safety, and many others. If the extraction, refining, and pipeline industries suddenly vanished from our borders, the provision of these social goods and services would have to be dramatically retrenched. The impact of these three industries goes far beyond just jobs and incomes.

V. Technological Changes

What is truly exciting about this industry are the **technological changes** which are dramatically improving the success rate in wildcat drilling and significantly boosting the total recovery from a field once the petroleum is found. Among these advances are **3-D and 4-D** (i.e., tracking a field with 3-D over time) **seismic** techniques which allow explorers to see what is below the surface much more efficiently. Back in the early 80s, drillers might have to drill 10 wells to hit

a producer; using 3-D and 4-D, only three wells are needed. Thus, the risk factor in this business has been significantly reduced. Also, recent advances in computing power have made seismic surveys easier and more accurate, allowing firms to see pockets of oil and natural gas at great depths. This advancement was crucial in the discovery of the lower tertiary formation associated with the initial deep water “Jack” Field, and others like Mad Dog, Tahiti, Perdido, Buckskin, and Big Foot.

Once the fields are discovered, **horizontal drilling** permits much more oil to be lifted from a discovery than in the past. For example, using older seismic and drilling techniques exploration companies were able to lift only about 35 percent of the oil in place. Adding 3-D and horizontal drilling raised that percentage to 40-50 percent. Then using 4-D there is a further improvement in some cases to 65-75 percent. Recently, ExxonMobil drilled what is called an "extended reach" horizontal well in Russia in the Odoptu Field where the horizontal portion of the well was 37,648 feet long (almost 7.3 miles), a new world record.¹⁴

A third major technological advance has been in **drilling and producing in great water depths**. Deepwater drillships are now capable of drilling in water depths in excess of 10,000 feet. In 2006, Chevron successfully completed a then record setting production test in the Gulf of Mexico in its “Jack Field”. This well was drilled in 7,000 feet of water and more than 20,000 feet under the ocean floor. Noble's Jim Day semi-submersible can drill in 12,000 feet of water. In late 2009, Chevron's Tahiti platform drilled the deepest producing well in the Gulf of Mexico at 26,700 feet---over five miles deep---4,000 of those feet being before hitting the floor of the Gulf. In January 2010, McMoran Exploration, operating in only 20 feet of water, used a gorilla-class rig to drill through 28,263 feet below sea level (about as deep as Mount Everest is high) in the Davy Jones Prospect.

Ingenious developments in production platforms have further enhanced the ability of exploration companies to plum the depths of the very productive Gulf of Mexico. In 1996, Shell Oil put in place the Mars platform in 2,940 feet of water, another new record for production platforms. Mars is a **tension leg platform** (tlp) rather than a fixed leg platform. Mars is basically tethered to the ocean bottom by very large metal tendons. From ocean bottom to the crown of the platform it was the tallest man-made structure ever built, equivalent to two Sears Towers end-to-end. The Mars field is projected to yield 700 million barrels of oil, the largest domestic find since Alaska's Prudhoe Bay discovery 30 years ago.

Serious advancements are being made in drill pipes---a crucial step if drilling is to take place in very deep waters and at very great depths. The Department of Energy has announced the development of **IntelliPipe**, a drill pipe with built in telemetry that can operate thousands of feet below the surface via a coupler embedded in connections between pipe sections. The coupler permits data to be sent across small gaps between pipe sections through a cable attached to an inner pipe wall.

The DOE also announced the development of a new **composite drill pipe** made from carbon fiber resins that are lighter, stronger, and more flexible than steel.¹⁵ **Composite tendons** have also been developed which are used to tether tension leg platforms and spars to the ocean floor. These too are lighter and stronger than tendons made with steel.¹⁶

ExxonMobil announced recently another technological advancement that will help speed up the drilling process. The optimization process---deemed the "**Fast Drill Process**"---uses real-time computer analysis of the drilling system's energy consumption, which helps improve the management of factors that determine the drilling rate, such as weight on the drill bit, rotary speed, and torque.¹⁷

Another interesting aspect of exploration in the Gulf is how **productive the fields are**. We have already referenced the projected output from Mars. By way of comparison, the onshore record for a single gas well is one in the Sweet Lake Field near Lake Charles, producing 50-55 million cubic feet (mmcf) per day. One well in the Gulf last year was producing at three times that rate. Oil production rates are also huge and the oil is flowing unusually fast. In many of these fields the oil is in **sheet sand** as opposed to sand stone. The former is much more porous, so the oil flows out easier and faster.

In early 2002, the Minerals Management Service approved the use of **Floating Production Storage Offloading** (FPSOs) vessels in the Gulf of Mexico. Rather than using a platform to produce oil, with pipelines tied back to the shore, these FPSOs lift the oil to the surface to a large ship. The oil is stored there and then offloaded on to a barge which can take the oil ashore to the port paying the highest price. These FPSOs are typically "dynamically positioned". That is, there are thrusters on the sides of the ship controlled by satellites that keep the ship within a small movement area, even in hurricane force winds.

At least one major technological change is enabling pipe to be laid much more efficiently in the Gulf---the **spool ship**. A spool ship designed by Global Industries has a 110 foot diameter spool of pipe on it that it simply reels off the pipe into the ocean. Welding the spool on shore is much cheaper than welding at sea, and a strand of pipe that took eight days to lay, may now take only one day.

Lastly, a major technological advance since our last report was **hydraulic fracking of shale** to release both natural gas and oil from shale deposits. In the case of the Haynesville Shale, this involves drilling down vertically about two miles then horizontally about 5,000 feet. Holes are

blown in the horizontal portion of the drill pipe; then a solution of water and chemicals is sent into the horizontal section under high pressure. The water/chemical solution frac's the shale, releasing the natural gas and/or oil. This advancement has taken the U.S. from a position of a shortage of natural gas to one where prices are being held down by an abundance of this fossil fuel. Super large plays in the Bakken Play in North Dakota and at other sites in the U.S. hold promise for a huge increase in U.S. oil production as well due to this new technological advancement.

Given this review, it is easy to see why there is considerable optimism about the future of the exploration sector in Louisiana.

VI. Summary and Conclusions

This study is an update of a study done for Mid-Continent Oil and Gas in 1996, and updated in 2002 and 2007 entitled, "The Energy Sector: A Giant Economic Engine for the Louisiana Economy." Our conclusions from this review of the impact of the extraction, refining, and pipeline industries can be summarized in a series of bullet points:

- Louisiana, through the luck of natural resource distribution, is the nation's **number one producer of crude oil and the number three producer of natural gas** among the 50 states.
- Louisiana ranks **number two among the states in petroleum refining** capacity.
- There are nearly **125,000 miles of pipelines** transporting crude petroleum and natural gas within the state and in its offshore area of the Gulf of Mexico.
- Through both their direct and multiplier effects **these three industries supported \$77.3 billion in sales in Louisiana firms, generated over \$16.1 billion in household earnings for Louisianans, and supported 310,217 jobs in the state in 2009.** The \$16.1 billion in earnings represented 13.6 percent of total earnings in Louisiana in that year. Eighty-six of the 185 countries ranked by the World Bank have smaller gross domestic products than \$16.1 billion.

- On average **the job multiplier for these three industries was 5.0**. That is, for every job created in these sectors 4.0 additional jobs are created in other sectors in the state. The job multiplier for the oil and gas extraction industry is about 3.7 and for the very capital-intensive refinery industry it is about 11.1, to no small extent because the state's refineries spent a massive \$2.9 billion on capital expenditures in 2009.
- These three industries directly **paid nearly \$1.4 billion in state taxes and fees** in FY10, or about 15.5 percent of total state taxes, licenses, and fees collected. Through the \$16.1 billion in household earnings generated by these three industries, **state government indirectly was able to collect an additional \$1,125,100,000 in taxes** in FY10, **for a total boost to the state treasury of \$2.5 billion in FY10**.
- A very conservative estimate is that these three industries directly paid **\$298 million in ad valorem taxes to local governments** in the state in 2009. In 41 of the state's 64 parishes, these ad valorem taxes exceeded \$1 million. In 18 parishes the number exceeded \$5 million. Dramatic increases in property tax receipts occurred in Caddo, Bossier, Desoto and Red River Parishes as a result of the new activity in the Haynesville Shale. The \$16.1 billion in household earnings generated by these three industries added approximately **\$707,200,000---nearly three-quarters of a billion dollars---indirectly** to the treasuries of local governments in FY10, for a total of just over **\$1 billion contributed to local government treasuries**.
- In 2010, there were **62,417 workers employed** in the extraction, pipeline, and refining industries--a number approximately equivalent to the 2008 population of Acadia Parish, the 18th most populous parish in the state. Fifty-six of Louisiana's 64 parishes had total covered employment smaller than this number in 2010.
- These three industries paid over **\$5.0 billion in wages** for Louisiana households in 2010---a figure equivalent to 6.8 percent of total covered wages in the state that year.
- In the second quarter of 2010, the average weekly wage in Louisiana's manufacturing sector was \$1,097. **In refining it was 60 percent higher at \$1,757 and the extraction sector paid \$1,991 weekly---81 percent higher than the average in manufacturing. Weekly wages in the pipeline industry were \$1,498---37 percent higher than the average manufacturing wage.**
- **Energy jobs and earnings are found in all of Louisiana's 64 parishes in 2010**. There were 15 parishes where more than 1,000 workers were employed in these three industries. In Lafayette Parish (the highest employment parish), 14,696 workers were directly employed in these energy sectors.
- Value added is a broader measure of the total income created directly in an industry. In 2007 (latest data available), **Louisiana's oil and gas extraction sector produced nearly \$43 billion in total income**. That figure exceeds the **sum** of all the state's manufacturing sectors.

- The refining sector's value added in 2009 was \$11.4 billion. That figure was 27.4 percent of the total value added the state's manufacturing sectors.

This report began with the statement: "It is the engine that makes the difference." For Louisiana, the presence of the extraction, refining, and pipeline industries have indeed made all the difference. The energy industry, and its accompanying multiplier effects, has been a powerful engine for economic growth in Louisiana.

APPENDIX A
A Non-Exhaustive Look at the Impacts of the
BP Oil Spill On One Year Anniversary

On April 20, 2010 there was a massive blowout on BP's deepwater Macando well in the Gulf of Mexico (GOM). Eleven people died in the aftermath, and two days later the platform sank to the bottom of the Gulf. The well released an estimated 4.9 million barrels of oil before being capped about three months later on July 15th. Dealing with this event captured the headlines for much of the middle part of 2010 and still remains a hot topic in the media. In this appendix, we present a non-exhaustive review of the impact of this event on the economy.

Impact on the Oil & Gas Extraction Industry

One of the sectors that was hardest hit by the after effects of the oil spill was the oil and gas extraction sector. Extraction activity in the Gulf is very important to the U.S. energy sector. About one-third of the nation's oil is produced from Gulf of Mexico wells. Some 10% of U.S. natural gas production is derived from the Gulf. In Louisiana, 17% of the state's gross state product originates from the extraction sector. The amount of that percentage that is derived from the Gulf has not been measured, but it is thought to be quite significant.

Prior to the spill, our team of forecasters at LSU expected the Houma and Lafayette MSAs to be among the fastest growing in the state, due to the discovery of the massive, and very productive, lower tertiary trend.¹ Lafayette is the home to many extraction companies and suppliers, and Houma is the home of Port Fourchon, a port out of which over 90% of the wells in the Gulf are serviced.

¹ Loren C. Scott, James A. Richardson, and M.D. Terrell, "Louisiana Economic Outlook: 2010-11", College of Business, LSU, October 2009.

After the spill, and the policy reactions to it, our forecasts were revised to suggest a marked slowdown from our forecasts issued in October 2009.² At the first anniversary of the spill, we remain far less optimistic about prospects in the Gulf of Mexico for extraction companies. Largely this is due to the impact that new federal regulatory policies---issued in response to the spill---are having on the industry.

The Moratorium Commission

As events unfurled immediately after the spill, President Obama asked for direction from the National Academy of Engineers. A group of petroleum engineers within the NAE provided guidance to the President. On May 28th, the President issued a moratorium on drilling in waters greater than 500 feet in the Gulf. Several members of the NAE study group issued public statements indicating they had definitely not recommended to the President that a moratorium be imposed.

The President then assigned a Moratorium Commission made up of nine members---not a single one of which had the skill set to analyze the problem. That is, there was not a single petroleum engineer in the group. In addition, the commission was front-loaded with anti-fossil fuels members. For example, Frances Beinecke is the President of the Natural Resources Defense Council, who on May 27th blogged: "We can blame BP for the disaster and we should. We can blame lack of adequate government oversight for the disaster and we should. But in the end, we also must place the blame where it originated: America's addiction to oil." She also called for bans on drilling offshore and in the Arctic.³ Co-Chairman Bob Graham was a Florida governor and senator who led efforts to ban drilling off his coast. Donald Boesch, president of the University of Maryland's Center for

² Loren C. Scott, James A. Richardson, and M.D. Terrell, "Louisiana Economic Outlook: 2011-12", College of Business, LSU, October 2010.

Environmental Science is quoted as saying "The impacts of the oil and gas extraction industry (both coastal and offshore) on Gulf Coast wetlands represent an environmental catastrophe of massive and unappreciated proportions."⁴ Terry Garcia is a National Geographic Society executive, a society whose magazine has been in the forefront of promoting global warming as an absolute scientific fact.

Those involved in the extraction industry in the GOM, and the companies that supplied them, watched as drillships began to leave the Gulf. The author and about 10 other concerned citizens met with two members of the Commission in Houma on a Saturday afternoon in early July 2010. One of the expressed purposes of that meeting was to convey to the Commission members a sense of urgency about doing their work. It was July, and the Commission had not even held its first meeting. More activity was leaving the Gulf for other locations, such as the West Coast of Africa. Commission members were indicating they did not expect to release a report until after the first of the year, an announcement that was met with gloom in the South Louisiana MSAs of Houma and Lafayette. The concern was that by then, many drillships would have left the Gulf, taking thousands of jobs with them.

The timeline for the report was prophetic. The Commission's report was released in January 2011.⁵ While the Commission came to several conclusions, one was left with the sense that the members felt there was a *systemic problem* in the industry in its operations in the Gulf. For example, consider this conclusion in the Commission's executive summary:

³ Seth Borenstein, "Leak Panel Big on Policy, Not Engineering" The Advocate, June 20, 2010, p.10A.

⁴ Ibid.

⁵ "Deepwater: The Gulf Oil Disaster and the Future of Offshore Drilling", Report to the President, National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, January 2011.

"Deepwater energy exploration and production, particularly at the frontiers of experience, involve risks for which neither industry nor government has been adequately prepared, but for which they can and must be prepared in the future."⁶

Some---including this author---might read this to suggest that the industry is embarking on something really new here, is unprepared for problems, and does not understand the risks involved in this environment. One might agree, if indeed the industry was involved in something new. In point of fact, there have been 55,000 wells drilled in the Federal Gulf of Mexico without a single major spill until this one.⁷ Add to that the fact that two of the worst storms in the history of the United States---Hurricanes Katrina and Rita---went right through the heart of the offshore activity in the Gulf in 2005, and there was not a single major spill. That is pretty strong evidence that the industry has had its act together, is aware of risks, and has been doing a solid job in minimizing them.

The Permitatorium

Even before the Commission's report was issued, President Obama lifted the moratorium on October 12, 2010. While this *officially* lifted the moratorium, it did not *effectively* lift it. The reason: The newly renamed Mineral Management Service (MMS)---now called the Bureau of Ocean Energy, Regulation and Enforcement (BOE)---was still not issuing permits for resumption of drilling in the Gulf. This practice earned the moniker "permitatorium".

For example, prior to the BP spill, the MMS was issuing permits at a rate of 13 per month. Between May 2010 and March 2011, the new BOE issued only 3 per month, and until March 1, 2011, all the permits issued were for shallow water wells. During this time, the 33 deepwater wells

⁶ Ibid. p. vii.

⁷ "Increased Safety Measures for Energy Development on the Outer Continental Shelf", U.S. Department of the Interior,

underway prior to the spill remained idle. It was not until March 1, 2011 that the first permit was issued to resume drilling in deep waters. By April 20, 2011 only 11 permits had been issued to resume drilling in deep waters in the Gulf. The permitatorium has been costly to the Gulf drilling economy. By May 2011, seven drillships had left the Gulf for West Africa, Brazil or other locations, taking their jobs and their massive support spending along with them.

Industry Response: MWCC & Helix

Another conclusion of the Moratorium Commission was the following:

"The technology, laws and regulations, and practices for containing, responding to and cleaning up spills lag behind the real risks associated with deepwater drilling into large, high-pressure reservoirs of oil and gas located far offshore and thousands of feet below the ocean's surface. Government must close the existing gap and industry must support *rather than resist* that effort (emphasis added)."⁸

Emphasis was added in the last sentence, because well before the commission had issued its report, the industry had reacted in a very predictable, *non-resistant* way without prodding from government. It is incomprehensible---except perhaps to people who have never worked in corporate America---to think that the industry would look at what happened with the Deepwater Horizon well and sit back with no reaction.

Two specific responses were initiated by the industry. Five companies---BP, ExxonMobil, Chevron, Shell and ConocoPhillips---formed a company in July 2010 called **Marine Well Containment Company** (MWCC), funded to the tune of \$1 billion. Recently, Anadarko, Apache,

May 27, 2010, p. 3.

⁸ "Deepwater: The Gulf Oil Disaster and the Future of Offshore Drilling", Report to the President, National Commission

and BHP Billiton have joined this consortium. This company has completed and made available a well containment response system that will provide rapid containment response capabilities in the event of a potential future well control incident in the deep waters of the Gulf. The company has developed a sub-sea capping stack with the ability to shut in oil flow or to flow the oil via flexible pipes and risers to surface vessels. The system includes sub-sea dispersant injection equipment and a system of cooperation among members with capture vessels.⁹

Secondly, Helix Energy assembled the **Helix Fast Response System** (HFRS). Helix has two vessels---the Helix Producer and the Q4000---which were actually used in response to the BP spill. The Helix Producer is a floating production vessel and the Q4000 is a multi-service vessel. The HFRS is capable of capping a wellhead in 8,000 feet of water and processing up to 55,000 barrels of oil per day and flaring 95 million cubic feet of natural gas.¹⁰

Both MWCC and HFRS will be paid retainers by companies operating in the Gulf for accessibility to their services.

Government Response: NTL 2010-05 & 06

After the spill, the MMS suffered a public relations nightmare. The Obama Administration accused the agency of being too cozy with the extraction industry and demanded a shake-up that resulted in the MMS being replaced by the BOE. Officials in the BOE responded by tightening regulations on operators in the Gulf. One response was Notice to Lessees number 5 (NTL 2010-05). This NTL mandated that operators must obtain third party certifications that key safety equipment, such as blow out preventers, would work and that all well designs were safe. The CEO of the

on the BP Deepwater Horizon Oil Spill and Offshore Drilling, January 2011, p. vii.

⁹ "MWCC Launches Interim Containment System", Offshore magazine, March 2011, p. 18.

operating company now must sign a statement certifying key equipment is safe, subject to criminal penalties. This regulation applies to shallow water operators as well as to those operating in deep waters. A tricky, and expensive, issue for the operators has been finding qualified third parties to certify their equipment.

NTL 2010-06 is a directive to all deep water drillers to submit detailed spill control and cleanup plans, including descriptions of worst case scenarios. The BOE left unclear the definition of a "worst case scenario". The MWCC and the Helix HFRS projects have been major factors in satisfying the requirements of NTL 2010-06.

Drilling/Production Costs in the GOM

Clearly, the cost to drill in the Gulf has increased significantly as a result of the spill. One source of these new costs is the **compliance costs** associated with adhering to the new regulations coming out of the BOE. Grant Thornton conducted a survey recently of 100 executives from independent producers and service companies. Sixty-eight percent of the respondents believed drilling costs would **increase 20%** or more due to changes in government regulations and that this could make new exploration and development projects uneconomic.¹¹ The Interior Department said in an October 14, 2010 notice in the Federal Register that the new rules would add \$1.42 million for each new deepwater well that uses a floating rig and \$90,000 to the cost of a shallow water well.¹²

A second new cost to operators in the Gulf comes from the **insurance industry**. Actuaries in insurance companies saw what happened with the Macando well and have been revising their rates upward. The author queried a Willis insurance executive about this issue and was told rates could go

¹⁰ "Helix Energy Outlines Oil Spill Response System" Oil and Gas Journal, March 7, 2011, pp. 39-40.

¹¹ "US Industry Expects Higher Costs Following Macando", Oil and Gas Journal, March 7, 2011, p. 40.

up 10-35% depending on a company's history. Moody's Investor Services estimated that rates could jump as much as 50%.¹³ Loretta Cross, managing partner of Grant Thornton's Corporate Advisory and Restructuring Services, reports that for some independents, the largest piece of their costs is insurance.¹⁴ The cost of insurance will be prohibitively expensive for smaller independents that are unable to self-insure.¹⁵

Economic theory and basic intuition indicate that the combination of the costs associated with compliance with new regulations and the costs of higher insurance premiums will lead to less exploration and production activity in the Gulf than was expected pre-spill.

Impact on Fisheries

The media especially focused on the fisheries industry at first. The industry in Louisiana, Mississippi, and Alabama was especially impacted as both state and federal government imposed fishing bans near the spill. By May 11th, 21,024 square miles of the GOM was off limits to fishing. As the spill spread, so did the no-fishing zone. By June 2nd, it expanded to 93,328 square miles. With the capping of the well on July 15th, the no-fishing zone began to collapse, covering 60,429 square miles by July 23rd.

Fishing Ban Impact on Catch and Prices

The imposition of the fishing ban clearly had an impact on the seafood catch. For example, comparing the shrimp catch over May-August, 2010 with the 3-year average, the catch fell by the

12 "Deepwater Drilling Outlook Remains Uncertain", *Offshore Magazine*, January 2011, p. 34.

13 "Higher Cost, Consolidation Expected In Gulf of Mexico", *Oil and Gas Journal*, September 6, 2010, p. 32.

14 *Ibid.*

15 *Ibid.*

following amounts: Mississippi: -88%; Louisiana: -56%; Alabama: -82%; Texas: -9%. Because much of the Florida shoreline avoided the non-fishing zone, the Florida West coast shrimp catch actually jumped 29%.¹⁶ Fishermen's losses from the reduced catch were partially offset by increases in shrimp prices due to the shortage created by the fishing ban. For example, comparing the shrimp price over May-August, 2010 with the 3-year average, the price rose by the following amounts: Mississippi/Louisiana/Alabama: +21% %; Texas: +14%; Florida West Coast: +13%.¹⁷

"Vessels of Opportunity" Offset

For some in this industry, the losses from the reduced fish catch were offset by hiring their boats out to BP in the cleanup effort in the "vessels of opportunity" program. BP hired 1,300 boats at \$1,200 to \$3,000 per boat per day plus \$200 per day per deck hand---an estimated payout of \$560 million over 180 days.

Uncertain Future

The question for the industry is "what does the future hold"? Here, there are two dominant issues.

The Market Brand Effect. One has to do with the public's reaction to consuming seafood from the GOM. The National Center for Food Protection and Defense conducted surveys in the summer of 2010 on this issue. Regarding the statement "I will only eat seafood that I know does not come from the Gulf", 22.3% of the respondents answered affirmatively to this question over the

¹⁶ Rex Caffey, Damage Assessment for Fisheries: Early Indications and Uncertainties, power point presentation, February 2011, Center for Natural Resource Economics & Policy, LSU Department of Agricultural Economics and Agribusiness.

¹⁷ Ibid.

weeks between May 10th and May 24th. For the weeks included in June 28th to July 12th, this percentage had risen to 28.2%.¹⁸

Is this fear on the part of these consumers well-founded or a miss-perception about the quality of the seafood coming out of the Gulf? Between April 30, 2010 and April 1, 2011, the Louisiana Department of Wildlife and Fisheries collected 1,286 seafood samples that were then analyzed by the Louisiana Department of Health and Hospitals. Trace levels of polycyclic aromatic hydrocarbons (PAHs) were detected in 709 samples, and dioctyl sodium sulfosuccinate (DOSS)---a major component of the dispersants used in the Gulf ---was detected in 13 samples. **However, no sample results showed levels of concern, meaning that any chemicals detected were below levels that could potentially threaten the public health.**¹⁹ These results suggest that to the extent that the public is concerned about the quality of the seafood coming from the Gulf, that concern is unfounded. Misperception or not, the question remains of how the Gulf seafood's market share will hold up both in the short and long run.

The Future Catch Effect. A second uncertainty has to do with future supplies of seafood from the Gulf. There is a measure called the "LC50". This measures the concentration of oil expected to kill 50% of animals exposed for 96 hours. As it turns out, the LC50 for adult shrimp, blue crab and oysters is quite high; that is, they are quite resilient to the effects of the spill. Fin fish are more mobile than the shellfish, and can typically swim away from the spill.

The bigger issue is the "baby effect" or what fisheries experts refer to as "recruitment". While adult shellfish and fin fish may be fairly tolerant to the spill effects, the LC50 for their larva, or babies,

¹⁸ Ibid, slide 9.

¹⁹ "Seafood Update", Department of Health and Hospitals, May 3, 2011.

is significantly lower. Plus, these babies tend to be phototropic; they tend to move upward toward the sun at the surface, which is also where the oil sheen is. The issue is complicated by the fact that species spawn at different times. Brown shrimp spawn in the January-March time frame, which means their larva may have avoided problems with the spill. On the other hand, white shrimp spawn between April and June, blue crab between March and June, and oysters in late May---periods covering the oil spill. How many larva were killed by the oil spill? That is an uncertainty that will affect future yearly catches.

There is another critical element that complicates our ability to forecast the effects on the future catch. Suppose that the spill killed 10% of the larvae. It does not follow that the future population of the species will decline by that amount. The reason? There was a fishing ban in place much of 2010. A lot of adults that would have been caught during this time period were not harvested. That is a population that is available to spawn (that would not have spawned otherwise), and that will create babies that would never have been born. Is this positive fishing ban effect enough to offset the negative impact of the possible larvae kill due to the spill? Only future catch data will answer this question. Agricultural economists who specialize in this area tell us the first four years after the spill are critical in making this determination. (Four years is suggested because the recruitment effect is highly variable, even absent an oil spill effect.)

Impact on Tourism

Economists and the legal community are still working on the impact of the spill on the tourism industry. It is the author's judgment that the impact on this sector was geographically limited: serious

in the summer 2010, serious in the fall of 2010 mainly due to faulty perceptions, and will basically recover in 2011.

Impact Geographically Limited

What do we mean by the phrase "geographically limited"? The phrase means that the biggest impact on the tourism industry was mainly focused on the area from east of Mobile Bay to about Panama City, Florida. This region is where people from all over the country come to play in the water. The beaches are nice, white-sand beaches, and the water is beautifully clear. The economies of this coastal area are dominated by two industries---the military and tourism. Very few other industries exist along this coastal area. If tourism takes a hit, the region really suffers.

Moving west of Mobile Bay is first of all Mississippi, which does have beaches, but the sand is browner and the water is not nice and clear due to silt runoff from the Mississippi River. The Mississippi coast tourism is far more based on its casino industry. Intuitively, it would seem the coastal casino industry would be little impaired by the spill, and to the extent that it was, the impacts will be hard to separate from the deleterious impacts of a poorly recovering national economy at the time.

Further west is Louisiana, which basically has no beach except for a sliver called Grand Isle, which is small, difficult to get to, and not a major tourism draw---certainly not compared to the Florida panhandle. The state does have a saltwater fishing industry that was negatively impacted by both the fishing ban and perceptions about the possible quality of the catch. While non-trivial, it is not a huge part of the Louisiana economy. In a report conducted by the author in 2004, the total expenditures by saltwater anglers in Louisiana in 2001 was \$278.7 million which includes

expenditures on food and lodging, equipment, transportation and trip costs.²⁰ As was the case for our analysis of the fisheries industry, how this industry fares as a result of the spill will begin to be manifested as we enter the late spring and summer months of 2011.

The Texas tourism sector should have been little impacted by the spill as the slick did not extend much beyond the eastern side of the Texas border.

Serious Impacts in Summer-Fall of 2010

To repeat, the greatest tourism impacts were heavily concentrated on the Northwest Florida panhandle. Tourists saw the spill on TV and the workers cleaning up beaches, and many potential visitors rearranged their plans to avoid the beaches on the northwest Florida coast.

There are two hard pieces of evidence to confirm this. First, there are the **tourism/recreation sales tax data** which are shown in Table X-1.

Table X-1
Tourism/Recreation Sales Tax Changes by MSA

MSA	March 2010	August 2010	February 2011
Fort Walton/Destin	6.8%	-20.2%	1.0%
Panama City	11.4%	-10.4%	4.8%
Pensacola	5.8%	-0.8%	9.4%

Source: Haas Center for Business Research and Economic Development, University of West Florida

Note that in March 2010, a month prior to the spill, these sales taxes were growing smartly in all three MSAs, especially so in the Panama City region. By August 2010, a month after the well was capped, results were reversed and these tax collections had declined sharply, especially in the Fort Walton/Destin and Panama City MSAs.

²⁰ Loren C. Scott, "The Economic Impact of Recreational Saltwater Fishing on the Louisiana Economy", report for the Coastal Conservation Association of Louisiana, April 2004, p. 4.

Similar results could be found in **bed tax collections** across the northwest Florida panhandle, as seen in Table X-2. Note that in the month prior to the spill, bed tax collections were basically stable (-0.3%). However, one month after the well was capped, bed tax collections were down a hefty 24.4%.

Table X-2
Change in Bed Tax Collections in Northwest Florida

March 2010	August 2010	February 2011
-0.3%	-24.4%	3.6%

Source: Haas Center for Business Research and Economic Development, University of West Florida

Our discussions with economic developers, association presidents, and economists in the northwest Florida panhandle region reveal a consistent pattern. Their argument is that the loss in tourism activity in the fall of 2010 was based on faulty perceptions and not reality. They note that (1) the waters were clean and clear by this time and (2) because of the cleanup activity, the beaches had never been cleaner. As one bank association president commented to the author, "There is not a beer can or old tire anywhere on the beach!" The author took his family to a banking conference in Sandestin in July of 2010, and the beaches were already pristine and the water was clear with tourist swimming in the Gulf. Condo and hotel operators in the Florida panhandle were frustrated by the public's faulty perception that things were grim on the Gulf.

Recovery in 2011

There is now evidence to indicate that word is getting out to the general public that things are back to normal on the Florida Gulf coast. Note back in Table X-1 that sales taxes in the tourism/recreation area have rebounded, and are up particularly strong in the Panama City (+4.8%) and Pensacola (+9.4%) MSAs. (The data in these tables show the change in collections in the month

shown compared to the same month in the previous year.) Similar findings are apparent for bed tax collections as shown back in Table X-2. Bed tax collections were up 3.6% in the northwest Florida panhandle in February 2011 as compared to February 2010.

Where Is the Oil?

How could this be? How can the tourism business be in a state of recovery this soon? After all, there was an estimated 4.9 million barrels of oil spilled as a result of the Macondo disaster. Where is the oil?

Of the 4.9 million barrels about 1.3 million barrels were either captured, flared off or burned. Another 1.5 million barrels was estimated to have evaporated or was biodegraded. That leaves a little over 2.1 million barrels left in the environment. (These numbers provided by Eliot Management.) Where the heck are those 2.1 million remaining barrels of oil? Why don't we see it on the beaches and on the water?

The answer to this question lies in a phrase offered by Dr. David Dismukes at LSU's Center for Energy Studies: "The solution to pollution is dilution." The next time you are on the Gulf coast, take a good hard look at the Gulf of Mexico. It is huge. It is estimated to hold 15 quadrillion barrels of water. About 2.1 million barrels still remaining sounds like a lot until you compare millions to quadrillions. To give perspective to the spill volume, Ryan Bilbo in the Division of Economic Development in LSU's E. J. Ourso College of Business compares it to putting a quarter teaspoon of oil in an Olympic-size swimming pool. Is it any wonder we cannot fill the remnant?

ENDNOTES

¹Oil and Gas Journal, January 3, 2011, p. 130.

²Oil and Gas Journal, December 6, 2010, p. 56.

³Brent Campbell, Director of Pipelines, Louisiana Department of natural Resources, email March 2011.

⁴Ibid.

⁵ Note that the category “support activities for mining” contains companies that drill for oil and provide service work (seismic, well servicing, etc.) to the industry.

⁶www.Laworks.net. Go to monthly employment data, "Louisiana Workforce at a Glance", March 10, 2011, p.12.

⁷ www.bea.gov/regiona/reis/drill.cfm.

⁸www.Laworks.net/Downloads/LMI.

⁹ www.bea.gov/regiona/spi

¹⁰Ibid. Total earnings by place of work in Louisiana in 2009 was \$118.1 billion.

¹¹www.bea.gov/regiona/reis/drill.

¹²[http://en.wikipedia.org/wiki/List_of_countries_by_gdp\(nominal\)](http://en.wikipedia.org/wiki/List_of_countries_by_gdp(nominal)).

¹³www.bls.gov/data/#employment.

¹⁴ Offshore Engineer, March 2011, p.10.

¹⁷Oil and Gas Journal, July 18, 2005, p.17.

¹⁸Oil and gas Journal, August 15, 2005, p. 39.

¹⁹Go Gulf Magazine, 2005, p. 24.

