

MARGINAL WELLS:

FUEL FOR ECONOMIC GROWTH

2007 Edition



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INTRODUCTION

INTRODUCTION

In 2006, the United States imported more than 72 percent of its crude oil needs. With a large amount of oil coming from unstable nations, and the growing demand for energy sources, like natural gas and oil in this country, America now more desperately than ever, needs to look to its own soil for answers.

Oftentimes overlooked, marginal, low-volume oil and natural gas wells contribute significantly to the nation's energy security. In 2006, these wells contributed nearly 18 percent of oil and 9 percent of natural gas produced onshore in this country.

For more than 60 years, the IOGCC has recognized the significance of marginal wells and has documented their production. This year's numbers again tell an encouraging story.

High natural gas and oil prices make production from these wells more economically feasible. While marginal gas production decreased slightly, the number of marginal gas wells rose by 3 percent over last year. Marginal oil production increased by 4 percent.

So what does this mean to the average American? In 2006 more than 9 jobs were dependent on every \$1 million of marginal oil and gas produced. In addition, states with marginal production collected \$1.26 billion in severance taxes - money that in many states is used for education.

But even at current prices, many of the small, mom and pop operators who typically run these wells find them difficult to maintain. Last year, nearly 12,000 marginal wells were plugged and abandoned resulting in a loss of \$1.77 billion in economic output, \$369.2 million in earnings reductions and the loss of 8,223 jobs.

To combat the premature abandonment of marginal wells research and technology must be strengthened. The National Petroleum Council agreed with the IOGCC in its 2007 report to the U.S. Department of Energy Secretary Samuel Bodman. The council cited support of regulatory streamlining and research and development programs for marginal wells as key components of reducing the current decline in domestic production.

In fact, any measure that increases an extra barrel of oil per well per month would result in more than 5 million barrels of extra oil each year, the equivalent of two super-tankers of imports.

It is the IOGCC's hope that its annual Marginal Well Report shines a light on the importance of these wells so that operators, the states that regulate them and the consumers who are affected by them have the information and resources to ensure the precious resources they make available are not wasted.

Marginal Oil

MARGINAL OIL

Marginal oil is produced from wells that operate on the lower edge of profitability. Generally speaking, low-volume “stripper” wells – defined by the IOGCC as those wells producing 10 barrels of oil per day or less – fall into this category. The IOGCC has monitored the status of marginal wells in the United States since the 1940s.

Why all the concern about such small-volume wells? While each individual well contributes only a small amount of oil (2.18 barrels a day, on average), there are 422,255 of these wells in the United

States. Combined, these marginal wells produced more than 335 million barrels of oil in 2006.

Plugged/Abandoned Wells

Many states have programs that allow a well to temporarily stop production. These “idle” wells are not included in the abandoned well category of this report; only wells that have been permanently plugged are included in the IOGCC’s definition. Also not included in this study’s abandoned well figures are “orphaned” wells. These are wells that are not producing, have not been plugged, and whose owners are either insolvent or cannot be located.

U.S. Marginal Oil Well Data – Past 10 Years

Year	Number of Marginal Oil Wells	Marginal Oil Production (bbls)	Average Daily Prod. Per Well (bbls)	Plugged/Abandoned
1997	420,674	323,487,914	2.11	15,172
1998	406,380	316,870,286	2.14	13,912
1999	410,680	315,514,283	2.10	11,227
2000	411,629	325,947,181	2.17	10,718
2001	403,459	316,099,192	2.15	12,234
2002	402,072	323,776,606	2.21	13,635
2003	393,463	313,748,001	2.18	14,300
2004	397,362	310,922,122	2.14	11,977
2005	401,072	321,761,570	2.20	11,058
2006	422,255	335,312,467	2.18	11,738

Enhanced Oil Recovery

U.S. oil production reached its peak in 1971 and has declined steadily since 1986. Enhanced oil recovery has been and will continue to be instrumental in recovering additional oil resources.

There are two enhanced oil recovery methods: secondary and tertiary. The term “secondary recovery” generally refers to waterflooding or hydrocarbon gas re-injection. Reservoir pressure is increased, or maintained, and oil is swept to the producing wells.

In older oil fields, reservoir pressure has diminished over time, decreasing the flow of oil. Secondary recovery operators permit the injection of a fluid, such as water or gas, into the formation. This increases the reservoir pressure and encourages the oil to flow more rapidly. In many states, the majority of marginal oil that was produced in 2006 was the result secondary recovery methods. Out of states surveyed that track secondary recovery efforts, more than half of the marginal oil produced in Kentucky, Nebraska, South Dakota and Utah was recovered using this technique, while more than 90 percent of the oil in Alabama and Indiana was produced using this method. The table to the right highlights the survey responses.

“Tertiary recovery” follows waterflooding operations and generally involves the injection of a miscible

fluid. Carbon dioxide is such a miscible fluid. Tertiary recovery can be achieved by using several methods. In one commonly used EOR technique, carbon dioxide is injected into a reservoir. As the CO₂ is injected it dissolves in the oil reducing the viscosity and surface tension of the oil droplets. The reduction in viscosity improves the flow rates of the remaining oil. Other techniques include thermal recovery, which uses heat to improve the flow of the oil, and chemical injection. The IOGCC does not track the amount of marginal oil produced using tertiary recovery at this time.

The National Petroleum Council in its 2007 Global Oil and Gas Study recommends the promotion of enhanced oil recovery by supporting regulatory streamlining and research and development programs for marginal wells and by expediting permitting of EOR projects, pipelines and associated infrastructure. The study indicates the potential effect of this could be an additional 90 to 200 billion barrels of recoverable oil in the United States alone, which could help slow the current decline in production.

Marginal Oil Well Reserve

An oil resource is defined as a reserve when it is deemed economically recoverable. To date, there is no comprehensive measurement of the total amount of stripper oil reserve in the United States. The table to the right indicates estimates by a handful of IOGCC marginal oil well survey respondents.

Secondary Recovery of Marginal Wells as of January 1, 2006

State	Estimated Secondary Oil Produced from Marginal Wells (Bbls)	Percent of Total Marginal Production
Alabama	850,938	92.7%
Arkansas	401,338	12.7%
Colorado	1,048,522	14.4%
Indiana	1,684,566	96.9%
Kentucky	1,268,531	70.6%
Nebraska	1,003,788	63.6%
New Mexico	5,789,127	40.3%
New York	25,929	8.8%
North Dakota	626,012	27.1%
Ohio	49,673	1.0%
South Dakota	34,940	64.5%
Utah	980,385	53.9%

Marginal Oil Well Reserve (Bbls)*

State	Primary	Secondary	Total
Arizona	230,000	0	230,000
Nebraska	2,194,340	3,826,600	6,020,940
New York	1,740,991	168,619	1,909,610
Ohio	32,093,740	106,260	32,200,000
Utah	1,804,890	2,274,300	4,079,190
Wyoming	70,000,000	n/a	70,000,000

* All states were surveyed. The table below only represents marginal oil well reserves from states that responded.

Marginal Wells: Fuel For Economic Growth

Marginal Oil Well Survey as of January 1, 2007

State	Number of Marginal Oil Wells	Production from Marginal Oil Wells (bbls)	Oil Wells Plugged and Abandoned	Average Daily Production Per Well	Total 2006 Oil Production (bbls)
Alabama	677	917,537	37	3.71	7,532,043
Arizona	20	30,469	0	4.17	54,807
Arkansas	4,000*	3,162,057*	63	2.17	6,080,878
California	28,016	37,503,478	1,924	3.67	222,961,274
Colorado	6,480	7,259,935	168 *	3.07	22,907,652
Florida	1	425*	1	1.16	2,359,853
Illinois	15,700*	9,441,470*	802*	1.65	10,323,084
Indiana	4,943	1,737,763	143	0.96	1,773,228
Kansas	54,200	27,417,150	1,081	1.39	36,100,000
Kentucky	20,000	1,796,536	424	0.25	2,339,987
Louisiana	19,338	13,453,243	510	1.91	73,893,463
Michigan	2,145*	2,826,374	57	3.61	5,694,934
Mississippi	1,858♦	895,452♦	33	1.32	17,785,614
Missouri	323	86,780	11	0.74	86,780
Montana	2,505	2,011,555	102	2.20	35,959,206
Nebraska	1,487	1,579,404	15	2.91	2,312,955
New Mexico	14,552	14,361,916	236	2.70	59,821,921
New York	2,793	293,651	6	0.29	293,651
North Dakota	1,457	2,309,795	67	4.34	39,930,445
Ohio	28,915	4,805,142	209	0.46	5,422,194
Oklahoma	47,026*	41,074,209*	747	2.39	52,090,774*
Pennsylvania	17,350*	3,626,000*	50*	0.57	3,626,000*
South Dakota	27	54,169	0	5.50	1,394,318
Tennessee	347*	126,956*	21*	1.00	192,974
Texas	130,553*	147,506,457*	4,781	3.10	344,701,294*
Utah	1,407	1,817,620	24	3.54	17,926,776
Virginia	3	779	7	0.71	16,564
West Virginia	3,668	970,802	28*	0.73	1,696,397
Wyoming	12,464	8,245,343	191	1.81	52,900,000
TOTALS	422,255	335,312,467	11,738	2.18	1,028,179,066**

* Estimated

** Total represents only oil production from states with stripper wells

♦ No data submitted for 2006, 2005 data used

U.S. State Rankings

	Number of Marginal Oil Wells	Production from Marginal Oil Wells (bbls)	Oil Wells Plugged and Abandoned	Average Daily Production Per Well
1	Texas	Texas	Texas	South Dakota
2	Kansas	Oklahoma	California	North Dakota
3	Oklahoma	California	Kansas	Arizona
4	Ohio	Kansas	Illinois	Alabama
5	California	New Mexico	Oklahoma	California
6	Kentucky	Louisiana	Louisiana	Michigan
7	Louisiana	Illinois	Kentucky	Utah
8	Pennsylvania	Wyoming	New Mexico	Texas
9	Illinois	Colorado	Ohio	Colorado
10	New Mexico	Ohio	Wyoming	Nebraska
11	Wyoming	Pennsylvania	Colorado	New Mexico
12	Colorado	Arkansas	Indiana	Oklahoma
13	Indiana	Michigan	Montana	Montana
14	Arkansas	North Dakota	North Dakota	Arkansas
15	West Virginia	Montana	Arkansas	Louisiana
16	New York	Utah	Michigan	Wyoming
17	Montana	Kentucky	Pennsylvania	Illinois
18	Michigan	Indiana	Alabama	Kansas
19	Mississippi	Nebraska	Mississippi	Mississippi
20	Nebraska	West Virginia	West Virginia	Florida
21	North Dakota	Alabama	Utah	Tennessee
22	Utah	Mississippi	Tennessee	Indiana
23	Alabama	New York	Nebraska	Missouri
24	Tennessee	Tennessee	Missouri	West Virginia
25	Missouri	Missouri	Virginia	Virginia
26	South Dakota	South Dakota	New York	Pennsylvania
27	Arizona	Arizona	Florida	Ohio
28	Virginia	Virginia	South Dakota	New York
29	Florida	Florida	Arizona	Kentucky

Comparative Figures: Marginal Wells and Marginal Oil Production

State	2003		2004	
	Number of Marginal Wells	Production from Marginal Wells (bbls)	Number of Marginal Wells	Production from Marginal Wells (bbls)
Alabama	632	1,152,351	669	1,141,127
Arizona	18	23,303	17	23,746
Arkansas	3,615	3,302,376	3,948	3,620,354
California	25,089	36,015,129	25,622	34,955,831
Colorado	5,334	5,442,974	5,605	6,316,308
Illinois	17,154*	10,600,000*	16,751*	10,040,292*
Indiana	5,049	1,864,883	5,004	1,729,606
Kansas	32,883	25,103,681	38,363	25,493,168
Kentucky	19,272	1,942,879	19,129	2,005,480
Louisiana	20,722	15,567,256	20,576	14,136,304
Michigan	2,578	2,500,500	2,306	3,055,339
Mississippi	437	604,800	478	678,566
Missouri	489	86,133	487	88,053
Montana	2,291	1,830,410	2,335	1,879,426
Nebraska	1,423	1,651,923	1,450	1,654,195
New Mexico	13,577	13,693,595	13,882	13,990,201
New York	2,763	152,967	2,759	171,760
North Dakota	1,394	2,288,191	1,392	2,205,309
Ohio	28,911	4,696,636	28,918	4,868,915
Oklahoma	48,657	43,703,475	48,250	41,427,782
Pennsylvania	15,758*	2,466,000*	16,061*	3,669,959*
South Dakota	24	51,461	20	35,452
Tennessee	385*	270,827	390	261,984
Texas	123,402	128,058,395	121,490	126,260,710
Utah	1,051	1,418,563	1,111	1,523,025
Virginia	7	2,502	6	1,974
West Virginia	8,200	1,400,000*	8,000	1,200,000
Wyoming	12,348	7,856,791	12,343	8,487,256
TOTALS	393,463	313,748,001	397,362	310,922,122

* Estimated

♦ No data submitted for 2006, 2005 data used

State	2005		2006	
	Number of Marginal Wells	Production from Marginal Wells (bbls)	Number of Marginal Wells	Production from Marginal Wells (bbls)
Alabama	665	911,785	677	917,537
Arizona	17	31,432	20	30,469
Arkansas	4,000	3,317,410	4,000*	3,162,057*
California	26,444	35,563,813	28,016	37,503,478
Colorado	5,982	7,001,499	6,480	7,259,935
Illinois	16,407*	8,461,222*	15,700	9,441,470
Indiana	5,364	1,594,296	4,943*	1,737,763*
Kansas	38,692	25,827,950	54,200	27,417,150
Kentucky	19,012	1,958,015	20,000	1,796,536
Louisiana	20,041	14,152,725	19,338	13,453,243
Michigan	2,011*	2,657,497	2,145*	2,826,374
Mississippi	1,858	895,452	1,858♦	895,452♦
Missouri	495	85,406	323	86,780
Montana	2,424	1,947,855	2,505	2,011,555
Nebraska	1,478	1,598,224	1,487	1,579,404
New Mexico	14,069	14,065,576	14,552	14,361,916
New York	2,553	211,292	2,793	293,651
North Dakota	1,416	2,217,706	1,457	2,309,795
Ohio	28,828	4,840,874	28,915	4,805,142
Oklahoma	46,798	39,318,486	47,026*	41,074,209*
Pennsylvania	16,662*	3,652,770*	17,350*	3,626,000*
South Dakota	27	54,169	27	54,169
Tennessee	290	235,127	347*	126,956*
Texas	124,116	139,959,142	130,553*	147,506,457*
Utah	1,163	1,618,810	1,407	1,817,620
Virginia	3	1,233	3	779
West Virginia	7,900	1,300,000	3,668	970,802
Wyoming	12,357	8,281,804	12,464	8,245,343
TOTALS	401,072	321,761,570	422,255	335,312,467

Marginal Gas

MARGINAL GAS

Marginal gas is natural gas produced from a well that operates on the lower edge of profitability.

Generally speaking, these are low-volume “stripper” gas wells – defined by the IOGCC as a natural gas well that produces 60 thousand cubic feet (Mcf) per day or less.

Marginal gas wells represent nearly 9 percent of the total natural gas produced onshore in the lower 48 states.

The table below indicates the status of marginal gas production over the past 10 years.

The number of gas wells in the marginal category has steadily increased during the past decade. However, the total marginal production and average daily production per well decreased slightly in 2006.

As with marginal oil wells, “abandoned” natural gas wells are those that have been permanently plugged.

U.S. Marginal Gas Well Data – Past 10 Years

Year	Number of Marginal Gas Wells	Marginal Gas Production (Mcf)	Plugged/Abandoned	Average Daily Prod. Per Well (Mcf)
1996	168,702	986,676,219	4,671	16.0
1997	189,756	1,042,153,002	4,661	15.0
1998	199,745	1,104,683,975	4,203	15.2
1999	207,766	1,138,979,506	3,546	15.0
2000	223,222	1,258,726,664	3,534	15.5
2001	234,507	1,353,516,378	3,600	15.8
2002	245,961	1,418,273,779	3,870	15.8
2003	260,563	1,478,105,524	3,883	15.5
2004	271,856	1,539,960,495	4,129	15.5
2005	288,898	1,760,063,552	4,517	16.7
2006	296,721	1,708,407,584	4,463	15.8

Marginal Wells: Fuel For Economic Growth

Marginal Gas Well Survey as of January 1, 2007

State	No. of Marginal Wells	Prod. from Marginal Gas Wells (Mcf)	Gas Wells Plugged and Abandoned	Average Daily Prod. Per Well (Mcf)	Total 2006 Gas Prod. (Mcf)
Alabama	3,069**	30,156,913**	41	26.9	301,335,239
Arizona	3	43,494	0	39.7	610,759
Arkansas	2,188*	18,700,000*	10	23.4	193,676,259
California	566	4,505,285	75	21.8	92,519,040
Colorado	9,599	94,485,949	114*	27.0	1,202,047,481
Illinois	551♦	184,000♦	51	0.9♦	347,000♦
Indiana	479	1,460,491	16	8.4	2,920,982
Kansas	13,868	178,670,000	237	35.30	438,494
Kentucky	17,500	91,500,000	79	14.3	95,319,607
Louisiana	9,942	52,154,475*	240	14.4	1,254,452,732
Maryland	8	20,878	0	7.2	20,878
Michigan	6,448	80,800,000	30	34.3	161,100,000
Mississippi	1,226♦	9,486,746♦	1	21.2♦	174,470,000♦
Montana	4,577	28,935,586	125	17.3	93,267,372
Nebraska	109	823,851	0	20.7	912,403
New Mexico	11,433	101,488,431	184	24.3	1,349,512,827
New York	5,516	10,170,315	13	5.1	53,972,758
North Dakota	88	691,183	4	21.5	62,786,939
Ohio	33,576	71,382,588	368	5.8	86,315,100
Oklahoma	13,249*	176,878,538*	343	36.6	1,517,639,579*
Pennsylvania	49,750*	156,705,000*	50*	8.6	158,355,000*
South Dakota	50	399,891	0	21.9	454,762
Tennessee	298*	1,792,984*	13*	16.5	1,792,984
Texas	40,099	320,508,067	1,636	21.9	5,479,536,290
Utah	1,587	15,962,409	41	27.6	356,329,357
Virginia	357	2,404,616	91	18.5	102,846,606
West Virginia	43,336	158,446,233	257*	10.0	219,411,397
Wyoming	27,249	99,649,661	444	10.0	1,926,000,000
TOTALS	296,721	1,708,407,584	4,463	15.8	14,888,391,845❖

* Estimated

** Includes natural gas from coal seams

❖ This figure represents only states with stripper natural gas production

♦ No data submitted for 2006, 2005 data used

U.S. State Rankings

	Number of Marginal Gas Wells	Production from Marginal Gas Wells	Total Natural Gas Production	Avg. Daily Production per Well
1	Pennsylvania	Texas	Texas	Arizona
2	West Virginia	Kansas	Wyoming	Oklahoma
3	Texas	Oklahoma	Ohio	Kansas
4	Ohio	West Virginia	Oklahoma	Michigan
5	Wyoming	Pennsylvania	West Virginia	Utah
6	Kentucky	New Mexico	Louisiana	Colorado
7	Kansas	Wyoming	Kansas	Alabama
8	Oklahoma	Colorado	New Mexico	New Mexico
9	New Mexico	Kentucky	Montana	Arkansas
10	Louisiana	Michigan	Colorado	South Dakota
11	Colorado	Ohio	Virginia	Texas
12	Michigan	Louisiana	Kentucky	California
13	New York	Alabama	California	North Dakota
14	Montana	Montana	Illinois	Mississippi
15	Alabama	Arkansas	Pennsylvania	Nebraska
16	Arkansas	Utah	Alabama	Virginia
17	Utah	New York	Utah	Montana
18	Mississippi	Mississippi	Michigan	Tennessee
19	California	California	Indiana	Louisiana
20	Illinois	Virginia	New York	Kentucky
21	Indiana	Tennessee	Tennessee	Wyoming
22	Virginia	Indiana	Arkansas	West Virginia
23	Tennessee	Nebraska	North Dakota	Pennsylvania
24	Nebraska	North Dakota	Mississippi	Indiana
25	North Dakota	South Dakota	Arizona	Maryland
26	South Dakota	Illinois	Maryland	Ohio
27	Maryland	Arizona	Nebraska	New York
28	Arizona	Maryland	South Dakota	Illinois

Comparative Figures: Marginal Wells and Marginal Gas Production

State	2003		2004	
	Number of Marginal Wells	Production from Marginal Wells (Mcf)	Number of Marginal Wells	Production from Marginal Wells (Mcf)
Alabama	1,931**	20,885,970**	2,194**	22,895,790**
Arizona	1	1,177	2	10,987
Arkansas	1,847*	16,252,825	1,913*	16,923,448
California	468	3,855,523	490	4,247,011
Colorado	7,342	73,077,507	7,780	79,619,265
Illinois	209	184,860	409	184,000
Indiana	2,291	1,464,372	2,386	3,401,445
Kansas	9,906	118,418,079	8,169	101,394,727
Kentucky	16,139	77,865,801	16,495	83,777,212
Louisiana	9,772	40,329,957*	9,784	44,477,263*
Maryland	7	34,943	7	33,391
Michigan	4,950	66,782,258	5,396	70,864,267
Mississippi	387	4,477,027	548	6,345,386
Montana	3,754	26,158,548	3,926	26,484,418
Nebraska	99	833,513	102	782,502
New Mexico	9,616	84,488,076	10,142	91,910,687
New York	5,723	11,518,289	5,710	10,261,189
North Dakota	67	762,017**	58	300,815
Ohio	33,367	75,109,000*	33,404	72,539,000
Oklahoma	20,321**	178,200,970**	23,845**	203,812,145**
Pennsylvania	42,437	133,455,545*	43,906*	136,394,002*
South Dakota	56	415,523	57	455,296
Tennessee	310*	1,411,060	270	1,936,268
Texas	33,312	268,891,683	35,240	284,361,426
Utah	1,099	11,928,457	1,225	12,854,032
Virginia	150	2,042,666**	228	3,050,649
West Virginia	38,240	188,000,000*	38,500	185,000,000
Wyoming	16,762**	71,259,878**	19,670**	75,643,874**
TOTALS	260,563	1,478,105,524	271,856	1,539,960,495

* Estimated

** Includes natural gas from coal seams

♦ No data submitted for 2006, 2005 data used

State	2005		2006	
	Number of Marginal Wells	Production from Marginal Wells (Mcf)	Number of Marginal Wells	Production from Marginal Wells (Mcf)
Alabama	2,620**	26,757,739**	3,069**	30,156,913**
Arizona	2	17,212	3	43,494
Arkansas	2,114	18,707,824	2,188*	18,700,000*
California	527	4,428,540	566	4,505,285
Colorado	8,861	88,788,233	9,599	94,485,949
Illinois	551	184,000	551♦	184,000♦
Indiana	2,110	3,134,583	13,868	1,460,491
Kansas	15,120	283,712,000	13,868	178,670
Kentucky	16,618	82,323,314	17,500	91,500,000
Louisiana	10,035	42,130,824*	9,942	52,154,475*
Maryland	7	36,468	8	20,878
Michigan	6,003	77,388,412	6,448	80,800,000
Mississippi	1,226	9,486,746	1,226♦	9,486,746♦
Montana	4,162	27,426,557	4,577	28,935,586
Nebraska	108	720,360	109	823,851
New Mexico	10,858	97,358,159	11,433	101,488,431
New York	5,607	9,896,329	5,516	10,170,315
North Dakota	68	401,057	88	691,183
Ohio	33,355	68,267,000	33,576	71,382,588
Oklahoma	18,706**	169,439,950**	13,249**	176,878,538**
Pennsylvania	46,654*	151,651,000*	49,750*	156,705,000*
South Dakota	50	399,891	50	399,891
Tennessee	315	2,200,000	298*	1,792,984*
Texas	37,396	302,083,547	40,099	320,508,067
Utah	1,419	14,429,074	1,587	15,962,409
Virginia	285	3,651,691	357	2,404,616
West Virginia	40,900	186,000,000	43,336	158,446,233
Wyoming	23,221**	89,043,042**	27,249**	99,649,661**
TOTALS	288,898	1,760,063,552	296,721	1,708,407,584

Economic Analysis

Nationalism and Energy Policy

By Dan Olds, Ryder Scott Petroleum

As reported last year, many oil exporting countries around the world have taken steps to gain control of their oil producing assets through efforts that can best be described as confiscatory. Flush with cash from the high prices and with governmental authority or backing, the governments (or quasi-governmental oil companies) have re-negotiated contracts or otherwise imposed business conditions that have forced their foreign partners / investors to accept reduced stakes or leave. It's hard for governments to resist this temptation to forget the original deal now that the economics are better – witness the U.S. Congress' attempts to re-negotiate the Deepwater Royalty Relief Act.

At the other extreme, we are seeing national and quasi-national oil companies pursuing ventures beyond their borders. For example, Chinese and Indian oil companies are seeking acquisitions and exploration ventures around the world. South American and Middle Eastern companies have also been active in pursuing projects beyond their borders. Not all of these companies represent their national governments, but many have their government's support in their efforts to diversify their portfolios and gain control of new oil and gas sources.

It is interesting to view these efforts as an expression of energy policy. Governments in exporting



countries recognize that their future economic power will be enhanced by greater control of their energy resources. Governments in energy importing countries, particularly those with large populations and expectations of high growth, are desperately trying to secure energy sources to ensure their continued growth.

This report deals with the economic contribution of marginal wells – admittedly a small portion of our national energy resource base, but a significant portion of our national oil and gas production base. The Energy Policy Act of 2005 (EPA2005) is 551 pages of initiatives that encompass all types of energy sources, conservation issues and research. However, the only reference to marginal wells is an

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incentive whereby royalties collected from marginal production on federal lands will be reduced if the average prices for oil and gas fall below \$15 per barrel or \$2 per mmbtu, for the period while prices stay below the thresholds.

Marginal production has a distinct advantage over many other types of energy sources proposed in EPA2005. It doesn't take research and we don't have to wait for it - it already exists. In fact, almost every existing onshore well in the United States will be a marginal well at some point in its life cycle, so there's going to be a steady supply in the future. Currently, 17.8 percent of our oil production and 8.8

percent of our natural gas production comes from marginal wells. Does this mean that no incentives or other efforts are necessary? No, because the amount of production we can expect from marginal wells is highly dependant on economics. Any price increases for oil or gas, or any operating cost reductions that can be achieved, have a disproportionate impact on marginal wells, greatly extending their productive life. While the per-well volumes are small, the sheer number of marginal wells exist-

ing – 719,000 wells in this year's report – means that any effort that maintains or prolongs their life has a significant impact.

Many states have enacted incentive programs to encourage marginal production. Since there are no production taxes at the federal level, the reduc-

Research and technology aimed at marginal producers has been an ongoing effort and should be strengthened. Any measure that increases an extra barrel of oil per well per month would result in more than 5 million barrels of extra oil each year, the equivalent of two super-tankers of imports.

tion in royalty rates on federal acreage is a valid way to provide incentives for producers to maintain these wells. However, we are not likely to see the low price thresholds set in EPA2005 unless we see a major worldwide recession. Therefore, these proposed incentives have little chance of promoting more

marginal production – they are a very small safety net in a worst case scenario.

States can further promote marginal production through additional production or ad valorem tax incentives or appropriate relaxation of regulatory requirements for small producers. The federal government could also directly promote marginal production through some realistic royalty reduction scenarios, income tax credits or appropriate

regulatory / compliance relief. Research and technology aimed at marginal producers has been an ongoing effort and should be strengthened. Any measure that increases an extra barrel of oil per well per month would result in more than 5 million barrels of extra oil each year, the equivalent of two super-tankers of imports.

The United States imported 72.6 percent of its crude oil needs in 2006 – more than 13.6 million barrels per day. Domestic production is about 5.1 million barrels per day. Of that, production from marginal or “stripper” wells is more than 918,000 barrels per day. So production from stripper wells accounts for more than 17.8 percent of domestic oil production. Using 2006’s average wellhead oil price of \$59.69 per barrel, \$20 billion dollars were not spent on additional imports.

In recent times, drilling in the United States has focused on natural gas for several reasons. The United States has been heavily explored, and as drillers probe deeper, they are more likely to encounter gas than oil. Additional gas pipelines have spurred development of once remote areas of the Rocky Mountain region. Finally, advances in fracture stimulation and higher gas prices have combined to make many low permeability reservoirs commercial. As a result, natural gas production increased in 2006 over 2005, for both total U.S. production and stripper production.

As with the drilling activity, the number of stripper gas wells has increased as well. Stripper gas accounted for 8.8 percent of U.S. production in 2006, while the number of stripper gas wells rose by about 3 percent. Stripper gas wells produced more than 1.7 TCF (Trillion cubic feet), at an average of 4.7 MMCF (Million cubic feet) per day.

In short, stripper oil and gas production is a significant portion of our domestic energy supply. Incentives enacted during the 1990s when prices were low have had a direct impact in preventing their premature abandonment. Now that prices are higher, these wells are still around to contribute. But even at current prices, natural production depletion will continue to push many wells to the point where their production is not economic to maintain. Continued or expanded incentives for those wells will allow continued production and contribute to domestic production levels.

Development of Report Findings

Using data from the IOGCC’s 2007 Marginal Well Report, Table 1 shows that the 11 survey states have 317,351 marginal oil wells, or more than 75 percent of the total reported marginal oil wells in the United States. These wells produced more than 90 percent of marginal oil well production. Oil wells in the survey states averaged 2.6 barrels of oil per day (BOPD), better than the overall national

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average of 2.2 BOPD. In 2006, 11,738 oil wells were plugged and abandoned, which is a decrease over last year's total of 13,265 oil wells plugged. Last year's report noted an unexpected increase in stripper oil well abandonment. This report notes a substantial increase in stripper oil wells, an increase of 21,183 wells over last year.

Looking at the marginal gas wells, Table 1 shows the 11 survey states have about 43 percent of the total 296,721 marginal gas wells in the United States. The total number of marginal gas wells in the United States increased by 7,823 over last year's total.

Our original 11 survey states were based on the largest producers of marginal oil, which excluded the Appalachian states from consideration. The Appalachian Basin accounts for about 51 percent of the marginal gas well count and almost 29 percent of the marginal gas produced. In order to preserve the comparability of this report, the marginal gas wells use the same survey states as the oil wells, as any error that may be introduced is not thought to be materially significant due to the higher relative value of marginal oil to marginal gas production.

Marginal gas wells produced 1,708 billion cubic feet (BCF) in 2006, about 4.7 BCF per day. Each well averaged 15.8 MCFD (thousand cubic feet per day). Of the total marginal gas wells, the

same percentage as the last two years, 1.5 percent or 4,463 wells were plugged and abandoned in 2006. Given the higher prices for both oil and gas, and the growing maturity of gas production, the changes in stripper well counts and plugging activity are in line with expectations.

Because of differences in the way and the time that each state and the federal government gathers oil and gas statistics, it is always a challenge to compile and analyze the data behind this report. This year's efforts were compounded by changes in the way the Department of Energy's Energy Information Agency (EIA) gathers gas production statistics.

Starting in 2006, they adopted a new system that focuses on obtaining early gas production data from a few key states. As a result, detailed state-by-state production data for 2006 will not be available until late 2007, although an overall U.S. total was available for this report. State gas production data has been allocated based on prior year's relative production totals.

Stripper well statistics are gathered at the state level. Analysis of this year's data suggests that some states have not been consistent in the way their statistics are compiled, as year-to-year changes appear anomalous. While this does not directly impact the findings of this report, it does make year-to-year comparability difficult.

Table 1: Marginal Wells Cumulative Impact on U.S. Economy

1.1 Marginal Oil

State	No. of Marginal Oil Wells	2006 Production from Marginal Wells (Bbls)	2006 Abandonments	2006 Average Daily Production Per Well - BOPD
California	28,016	37,503,478	1,924	3.7
Colorado	6,480	7,259,935	168	3.1
Kansas	54,200	27,417,150	1,081	1.4
Louisiana	19,338	13,453,243	510	1.9
Mississippi	1,858	895,452	33	1.3
New Mexico	14,552	14,361,916	236	2.7
North Dakota	1,457	2,309,795	67	4.3
Oklahoma	47,026	41,074,209	747	2.4
Texas	130,553	147,506,457	4,781	3.1
Utah	1,407	1,817,620	24	3.5
Wyoming	12,464	8,245,343	191	1.8
SUBTOTAL	317,351	301,844,598	9,762	2.6
ALL OTHERS	104,904	33,467,869	1,976	0.9
TOTAL U.S.	422,255	335,312,467	11,738	2.2

1.2 Marginal Gas

State	No. of Marginal Gas Wells	2006 Production from Marginal Wells (MCF)	2006 Abandonments	2006 Average Daily Production Per Well - MCFD
California	566	4,505,285	75	21.8
Colorado	9,599	94,485,949	114	27.0
Kansas	13,868	178,670,000	237	35.3
Louisiana	9,942	52,154,475	240	14.4
Mississippi	1,226	9,486,746	1	21.2
New Mexico	11,433	101,488,431	184	24.3
North Dakota	88	691,183	4	21.5
Oklahoma	13,249	176,878,538	343	36.6
Texas	40,099	320,508,067	1,636	21.9
Utah	1,587	15,962,409	41	27.6
Wyoming	27,249	99,649,661	444	10.0
SUBTOTAL	128,906	1,054,480,744	3,319	22.4
ALL OTHERS	167,815	653,926,840	1,144	10.7
TOTAL U.S.	296,721	1,708,407,584	4,463	15.8

1.3 Marginal Oil & Gas

	No. of Marginal Wells	2006 Abandonments
SUBTOTAL	446,257	13,081
ALL OTHERS	272,719	3,120
TOTAL U.S.	718,976	16,201

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Wellhead Prices

Wellhead prices shown in Table 2 are derived from data gathered directly from the various state agencies and the EIA. These statistics show that the weighted average wellhead price was \$60.05 per barrel of oil, versus 2005's average of \$51.14 per barrel. The weighted average price for gas was \$6.51 per MCF, versus 2005's average of \$7.44 per MCF.

In this year's report, state-by-state wellhead oil prices were available from the EIA, but not for

natural gas. Estimates for state gas prices were determined using the ratio of state to national prices observed from the EIA's 2005's data and applied to the EIA's 2006 nationwide wellhead gas price estimate of \$6.42 per MCF. Production from Alaska and Federal Offshore areas (OCS) were excluded from the analysis since there is essentially no marginal production from these areas and the large volume of their production tends to skew the data. This accounts for the difference in total U.S. price as shown in this report, \$6.51 per MCF, and the EIA nationwide wellhead price of \$6.42 per MCF.

Table 2: 2006 Wellhead Prices

State	Total Oil Value \$ x 1,000	Total Oil Production BBL x 1,000	Weighted Average Wellhead \$/BBL	Total Gas Value \$ x 1,000	Total Gas Production MCF x 1,000	Weighted Average Wellhead \$/MCF
California	\$12,812,566	223,449	\$57.34	\$2,104,469	322,519	\$6.53
Colorado	\$1,297,501	20,337	\$63.80	\$7,644,584	1,174,719	\$6.51
Kansas	\$2,134,161	35,136	\$60.74	\$2,085,263	365,720	\$5.70
Louisiana	\$4,789,631	74,570	\$64.23	\$10,536,476	1,379,583	\$7.64
Mississippi	\$1,033,402	17,412	\$59.35	\$438,995	60,754	\$7.23
New Mexico	\$3,576,660	57,931	\$61.74	\$9,708,422	1,604,130	\$6.05
North Dakota	\$2,264,369	39,943	\$56.69	\$406,093	55,197	\$7.36
Oklahoma	\$3,898,683	61,776	\$63.11	\$11,107,949	1,759,007	\$6.31
Texas	\$23,608,151	385,062	\$61.31	\$36,744,986	5,556,740	\$6.61
Utah	\$1,045,407	17,511	\$59.70	\$2,158,431	344,187	\$6.27
Wyoming	\$2,710,745	50,906	\$53.25	\$10,428,475	1,735,664	\$6.01
SUBTOTAL	\$59,171,275	984,033	\$60.13	\$93,364,144	14,358,220	\$6.50
ALL OTHERS	\$5,100,488	86,274	\$59.12	\$11,468,042	1,735,458	\$6.42
TOTAL U.S. *	\$64,271,762	1,070,307	\$60.05	\$104,832,186	16,093,678	\$6.51

* Excludes Alaska and Federal Offshore production.

Effects of Abandonment

Using production and price data from Tables 1 and 2, Tables 3A and 3B show the gross value associated with marginal wells. Assuming the average marginal well producing rates for each state, Table 3A shows the oil and gas wells plugged and abandoned in the survey states during 2006 would have produced oil and gas valued at \$793.4 million. The total value of oil and gas lost due to abandonments during 2006 for all states was \$878.3 million.

If the oil production from marginal wells active in 2006 did not exist, imports would have increased 6.74 percent to make up for the shortage.

It should be noted that, by attributing the average production rates of existing wells to abandoned wells, the actual productivity of abandoned wells may be slightly overstated. While no data was found to estimate the average production rates at the time of abandonment, the IOGCC and U.S. Department of Energy estimate the range is between one and two BOPD, and the equivalent rate of 10 to 20 MCFD is assumed for gas wells.

To illustrate the overall economic impact on the U.S. economy, Table 3B assumes the abandonment of all marginal wells. This shows a theoretical loss

value of \$25 billion for the survey states or \$31.3 billion for the total United States in 2006.

If the marginal oil and gas production represented in Table 3B were indeed lost to the United States, this would represent about 918.7 thousand barrels of oil and 4.7 BCF of gas each day. Using the weighted

average wellhead prices for marginal production, the daily amount that would have to be spent on imports would be \$85.7 million each day.

In 2006, American Petroleum Institute

(API) statistics show that we imported 4.97 billion barrels of crude oil and products. If the oil production from stripper wells active in 2006 did not exist, imports would have increased 6.74 percent to make up for the shortage. EIA statistics show that 2006's total marketed gas production was 19,382 BCF. (Note: this figure includes federal offshore gas production) Marginal gas wells contributed 8.8 percent of the total production. EIA statistics also show the total of 2006 natural gas imports was 4,187 BCF, an amount equal to 21.6 percent of natural gas production. If marginal gas wells did not exist, imports to make up the shortage would bring the level up to 30.4 percent of production.

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Table 3A: Effect of 2006 Abandonments

3A.1 Oil

State	No. of Marginal Wells	2006 Production From Marginal Wells (Bbls.)	2006 Abandonments	2006 Average Daily Production Per Well - BOPD	Lost Annual Production BBLs	2006 Average \$/BBL	2006 Lost Gross Revenue
California	28,016	37,503,478	1,924	3.7	2,575,553	\$57.34	\$147,682,207
Colorado	6,480	7,259,935	168	3.1	188,221	\$63.80	\$12,008,470
Kansas	54,200	27,417,150	1,081	1.4	546,825	\$60.74	\$33,214,178
Louisiana	19,338	13,453,243	510	1.9	354,802	\$64.23	\$22,788,909
Mississippi	1,858	895,452	33	1.3	15,904	\$59.35	\$943,911
New Mexico	14,552	14,361,916	236	2.7	232,917	\$61.74	\$14,380,313
North Dakota	1,457	2,309,795	67	4.3	106,216	\$56.69	\$6,021,368
Oklahoma	47,026	41,074,209	747	2.4	652,457	\$63.11	\$41,176,550
Texas	130,553	147,506,457	4,781	3.1	5,401,855	\$61.31	\$331,187,728
Utah	1,407	1,817,620	24	3.5	31,004	\$59.70	\$1,850,949
Wyoming	12,464	8,245,343	191	1.8	126,353	\$53.25	\$6,728,283
SUBTOTAL	317,351	301,844,598	9,762	2.6	10,232,106	\$60.13	\$615,270,805
ALL OTHERS	104,904	33,467,869	1,976	0.9	909,655	\$59.12	\$53,778,496
TOTAL U.S. *	422,255	335,312,467	11,738	2.2	11,141,762	\$60.05	\$669,060,991

3A.2 Gas

State	No. of Marginal Wells	2006 Production From Marginal Wells (MCF)	2006 Abandonments	2006 Average Daily Production Per Well - MCFD	Lost Annual Production MCF	2006 Average \$/MCF	2006 Lost Gross Revenue
California	566	4,505,285	75	21.8	596,990	\$6.53	\$3,895,421
Colorado	9,599	94,485,949	114	27.0	1,122,138	\$6.51	\$7,302,406
Kansas	13,868	178,670,000	237	35.3	3,053,417	\$5.70	\$17,409,977
Louisiana	9,942	52,154,475	240	14.4	1,259,010	\$7.64	\$9,615,605
Mississippi	1,226	9,486,746	1	21.2	7,738	\$7.23	\$55,913
New Mexico	11,433	101,488,431	184	24.3	1,633,331	\$6.05	\$9,885,150
North Dakota	88	691,183	4	21.5	31,417	\$7.36	\$231,143
Oklahoma	13,249	176,878,538	343	36.6	4,579,164	\$6.31	\$28,916,950
Texas	40,099	320,508,067	1,636	21.9	13,076,416	\$6.61	\$86,470,252
Utah	1,587	15,962,409	41	27.6	412,387	\$6.27	\$2,586,125
Wyoming	27,249	99,649,661	444	10.0	1,623,709	\$6.01	\$9,755,811
SUBTOTAL	128,906	1,054,480,744	3,319	22.4	27,395,717	\$6.50	\$178,140,305
ALL OTHERS	167,815	653,926,840	1,144	10.7	4,728,031	\$6.42	\$30,353,957
TOTAL U.S. *	296,721	1,708,407,584	4,463	15.8	32,123,747	\$6.51	\$209,250,034

3A.3 Oil & Gas

	No. of Marginal Wells	2006 Abandonments	2006 Lost Gross Revenue
SUBTOTAL	446,257	13,081	\$793,411,110
ALL OTHERS	272,719	3,120	\$84,132,453
TOTAL U.S. *	718,976	16,201	\$878,311,024

* Excludes Alaska and Federal Offshore production.

Table 3B: Effect of Hypothetical Abandonment of all Marginal Wells

3B.1 Oil

STATE	No. of Marginal Wells	2006 Production From Marginal Wells (Bbls.)	Hypothetical Abandonments	2006 Average Daily Production Per Well - BOPD	Lost Annual Production BBLs	2006 Average \$/BBL	Hypothetical 2006 Lost Gross Revenue
California	28,016	37,503,478	28,016	3.7	37,503,478	\$57.34	\$2,150,449,429
Colorado	6,480	7,259,935	6,480	3.1	7,259,935	\$63.80	\$463,183,853
Kansas	54,200	27,417,150	54,200	1.4	27,417,150	\$60.74	\$1,665,317,691
Louisiana	19,338	13,453,243	19,338	1.9	13,453,243	\$64.23	\$864,101,798
Mississippi	1,858	895,452	1,858	1.3	895,452	\$59.35	\$53,145,076
New Mexico	14,552	14,361,916	14,552	2.7	14,361,916	\$61.74	\$886,704,694
North Dakota	1,457	2,309,795	1,457	4.3	2,309,795	\$56.69	\$130,942,279
Oklahoma	47,026	41,074,209	47,026	2.4	41,074,209	\$63.11	\$2,592,193,330
Texas	130,553	147,506,457	130,553	3.1	147,506,457	\$61.31	\$9,043,620,879
Utah	1,407	1,817,620	1,407	3.5	1,817,620	\$59.70	\$108,511,914
Wyoming	12,464	8,245,343	12,464	1.8	8,245,343	\$53.25	\$439,064,515
SUBTOTAL	317,351	301,844,598	317,351	2.6	301,844,598	\$60.13	\$18,150,336,007
ALL OTHERS	104,904	33,467,869	104,904	0.9	33,467,869	\$59.12	\$1,978,608,269
TOTAL U.S. *	422,255	335,312,467	422,255	2.2	335,312,467	\$60.05	\$20,135,459,385

3B.2 Gas

State	No. of Marginal Wells	2006 Production From Marginal Wells (MCF)	Hypothetical Abandonments	2006 Average Daily Production Per Well - MCFD	Lost Annual Production MCF	2006 Average \$/MCF	Hypothetical 2006 Lost Gross Revenue
California	566	4,505,285	566	21.8	4,505,285	\$6.53	\$29,397,446
Colorado	9,599	94,485,949	9,599	27.0	94,485,949	\$6.51	\$614,875,370
Kansas	13,868	178,670,000	13,868	35.3	178,670,000	\$5.70	\$1,018,740,752
Louisiana	9,942	52,154,475	9,942	14.4	52,154,475	\$7.64	\$398,326,423
Mississippi	1,226	9,486,746	1,226	21.2	9,486,746	\$7.23	\$68,549,182
New Mexico	11,433	101,488,431	11,433	24.3	101,488,431	\$6.05	\$614,222,384
North Dakota	88	691,183	88	21.5	691,183	\$7.36	\$5,085,146
Oklahoma	13,249	176,878,538	13,249	36.6	176,878,538	\$6.31	\$1,116,969,869
Texas	40,099	320,508,067	40,099	21.9	320,508,067	\$6.61	\$2,119,419,716
Utah	1,587	15,962,409	1,587	27.6	15,962,409	\$6.27	\$100,101,944
Wyoming	27,249	99,649,661	27,249	10.0	99,649,661	\$6.01	\$598,729,966
SUBTOTAL	128,906	1,054,480,744	128,906	22.4	1,054,480,744	\$6.50	\$6,856,747,857
ALL OTHERS	167,815	653,926,840	167,815	10.7	653,926,840	\$6.42	\$4,198,210,313
TOTAL U.S. *	296,721	1,708,407,584	296,721	15.8	1,708,407,584	\$6.51	\$11,128,351,279

3B.3 Oil & Gas

	No. of Marginal Wells	Hypothetical Abandonments	2006 Lost Gross Revenue
SUBTOTAL	446,257	446,257	\$25,007,083,864
ALL OTHERS	272,719	272,719	\$6,176,818,582
TOTAL U.S. *	718,976	718,976	\$31,263,810,664

* Excludes Alaska and Federal Offshore production.

RIMS II Multipliers

Until 2003, this report was based on RIMS II multipliers provided by the Bureau of Economic Analysis (BEA) for industry number 8.0000, Crude Petroleum and Natural Gas. Since then, revised multipliers based on the BEA's 1997 national and 2001 regional accounts have been used.

The RIMS II multipliers based on this updated work were first released in May 2004. The multipliers have been re-categorized to Industry 211000, Oil and Gas Extraction. A comparison of these new factors against the old shows that the overall multiplication effect has on average increased for output and earnings for all of the survey states.

However, the employment, while up on average, is not up for all states. The basic implication of these changes is that the economic activity generated by marginal well production has a larger impact on the U.S. economy under the revised multipliers, assuming no change in price levels. The magnitude of that impact is dependant on the prices received for the oil and gas.

The multipliers are shown in Table 4. The Final Demand Multipliers shown in the first three columns represent the total economic impact on the region relative to a change in demand of the

output, which, in this case, is expressed as the value of marginal oil production.

The same oil and gas values can be used to determine the total impact on earnings and employment for the region. These final demand multipliers include output, earnings and employment not only within the crude petroleum and natural gas industry, but also from secondary interrelated industries that are impacted in the region. Examples of these secondary sectors could be non-oilfield equipment manufacturers, local retailers and health care professionals that provide goods and services to both the oil sector and other sectors. Please refer to the Appendix for a more complete discussion about RIMS.

The direct effect multipliers shown in the fourth and fifth columns represent the total impact relative to a direct change in household earnings or employment. They are used whenever changes in household earnings or employment are known. As presented, they are not directly applicable for the purposes of this study. However, they represent the ratio between the industry specific multiplier and the final demand multiplier. This relationship allows the calculation of earnings and employment multipliers for the oil and gas industry alone (sixth and seventh columns), without regard to the earnings and employment levels of any secondary industries.

Table 4: RIMS II Multipliers

STATE	FINAL DEMAND MULTIPLIERS			DIRECT EFFECT MULTIPLIERS		CALCULATED O&G INDUSTRY MULTIPLIERS	
	OUTPUT	EARNINGS	EMPLOYMENT	EARNINGS	EMPLOYMENT	EARNINGS	EMPLOYMENT
California	1.9891	0.4319	9.5	2.4103	2.7602	0.1792	3.4506
Colorado	2.0627	0.4337	8.6	2.5391	4.5789	0.1708	1.8861
Kansas	1.9466	0.3788	14.1	2.1995	2.0271	0.1722	6.9618
Louisiana	1.8321	0.3628	8.8	2.3102	3.7887	0.1570	2.3275
Mississippi	1.6049	0.3035	9.3	2.0655	2.4289	0.1469	3.8365
New Mexico	1.6563	0.3487	10.0	2.0363	2.6812	0.1712	3.7421
North Dakota	1.7441	0.3538	11.0	2.0231	2.4251	0.1749	4.5305
Oklahoma	2.0400	0.4224	11.5	2.3894	3.6824	0.1768	3.1144
Texas	2.0853	0.4334	8.4	2.4727	5.3808	0.1753	1.5675
Utah	1.8940	0.4018	11.6	2.4387	3.1276	0.1648	3.7026
Wyoming	1.7344	0.3242	7.9	1.8970	2.9567	0.1709	2.6753

U.S. Economic Impact

Tables 5A and 5B show the economic impact of marginal oil and gas production.

Using the values determined from Table 3A and the multipliers from Table 4, Table 5A shows that the marginal oil and gas wells plugged and abandoned in 2006 resulted in a reduction of total economic output of \$1.77 billion, earnings reductions of \$369.2 million and lost employment of 8,223

jobs. In 2006 the oil and gas industry alone lost \$153.5 million of earnings and 2,262 jobs to the marginal well abandonments of the previous year.

Table 5B shows the economic impact of the theoretical abandonment of all marginal oil and gas wells. Economic output would decline by \$62.1 billion, earnings would decrease by \$12.8 billion and 304,619 jobs would be lost. **Within the oil and gas industry alone, \$5.4 billion of earnings and 88,555 jobs would be lost.**

Marginal Wells: Fuel For Economic Growth

Table 5A: Economic Effects of 2006's Abandonments

5A.1 Oil

State	2006 Revenue Lost From Abandonment Million \$	Final Demand Multipliers Output	Final Demand Multipliers Earnings	Final Demand Multipliers Employment	OVERALL EFFECT IN FINAL DEMAND			Direct Effect Multipliers Earnings	Direct Effect Multipliers Employment	OIL & GAS INDUSTRY	
					Lost Output Million \$	Lost Earnings Million \$	Lost Employment			Lost Earnings Million \$	Lost Employment
California	\$147.682	1.9891	0.4319	9.5	\$293.755	\$63.784	1,407	0.1792	3.4506	\$26.463	510
Colorado	\$12.008	2.0627	0.4337	8.6	\$24.770	\$5.208	104	0.1708	1.8861	\$2.051	23
Kansas	\$33.214	1.9466	0.3788	14.1	\$64.655	\$12.582	469	0.1722	6.9618	\$5.720	231
Louisiana	\$22.789	1.8321	0.3628	8.8	\$41.752	\$8.268	201	0.1570	2.3275	\$3.579	53
Mississippi	\$0.944	1.6049	0.3035	9.3	\$1.515	\$0.286	9	0.1469	3.8365	\$0.139	4
New Mexico	\$14.380	1.6563	0.3487	10.0	\$23.818	\$5.014	144	0.1712	3.7421	\$2.463	54
North Dakota	\$6.021	1.7441	0.3538	11.0	\$10.502	\$2.130	66	0.1749	4.5305	\$1.053	27
Oklahoma	\$41.177	2.0400	0.4224	11.5	\$84.000	\$17.393	472	0.1768	3.1144	\$7.279	128
Texas	\$331.188	2.0853	0.4334	8.4	\$690.626	\$143.537	2,793	0.1753	1.5675	\$58.049	519
Utah	\$1.851	1.8940	0.4018	11.6	\$3.506	\$0.744	21	0.1648	3.7026	\$0.305	7
Wyoming	\$6.728	1.7344	0.3242	7.9	\$11.670	\$2.181	53	0.1709	2.6753	\$1.150	18
SUBTOTAL	\$615.271	2.0325	0.4244	9.3	\$1,250.567	\$261.127	5,739	0.1759	2.5600	\$108.250	1,573
ALL OTHERS*	\$53.779	2.0325	0.4244	9.3	\$109.305	\$22.824	500	0.1759	2.5600	\$9.460	138
TOTAL	\$669.061	2.0325	0.4244	9.3	\$1,359.872	\$283.951	6,240	0.1759	2.5600	\$117.710	1,711

5A.2 Gas

State	2006 Revenue Lost From Abandonment Million \$	Final Demand Multipliers Output	Final Demand Multipliers Earnings	Final Demand Multipliers Employment	OVERALL EFFECT IN FINAL DEMAND			Direct Effect Multipliers Earnings	Direct Effect Multipliers Employment	OIL & GAS INDUSTRY	
					Lost Output Million \$	Lost Earnings Million \$	Lost Employment			Lost Earnings Million \$	Lost Employment
California	\$3.895	1.9891	0.4319	9.5	\$7.748	\$1.682	37	0.1792	3.4506	\$0.698	13
Colorado	\$7.302	2.0627	0.4337	8.6	\$15.063	\$3.167	63	0.1708	1.8861	\$1.247	14
Kansas	\$17.410	1.9466	0.3788	14.1	\$33.890	\$6.595	246	0.1722	6.9618	\$2.998	121
Louisiana	\$9.616	1.8321	0.3628	8.8	\$17.617	\$3.489	85	0.1570	2.3275	\$1.510	22
Mississippi	\$0.056	1.6049	0.3035	9.3	\$0.090	\$0.017	1	0.1469	3.8365	\$0.008	0
New Mexico	\$9.885	1.6563	0.3487	10.0	\$16.373	\$3.447	99	0.1712	3.7421	\$1.693	37
North Dakota	\$0.231	1.7441	0.3538	11.0	\$0.403	\$0.082	3	0.1749	4.5305	\$0.040	1
Oklahoma	\$28.917	2.0400	0.4224	11.5	\$58.991	\$12.215	332	0.1768	3.1144	\$5.112	90
Texas	\$86.470	2.0853	0.4334	8.4	\$180.316	\$37.476	729	0.1753	1.5675	\$15.156	136
Utah	\$2.586	1.8940	0.4018	11.6	\$4.898	\$1.039	30	0.1648	3.7026	\$0.426	10
Wyoming	\$9.756	1.7344	0.3242	7.9	\$16.920	\$3.163	77	0.1709	2.6753	\$1.667	26
SUBTOTAL	\$178.140	1.9777	0.4244	9.3	\$352.309	\$72.371	1,701	0.1715	2.6400	\$30.556	470
ALL OTHERS*	\$30.354	1.9777	0.4244	9.3	\$60.031	\$12.882	282	0.1715	2.6400	\$5.206	80
TOTAL	\$209.250	1.9706	0.4244	9.3	\$412.340	\$85.254	1,983	0.1709	2.6300	\$35.762	550

5A.3 Oil & Gas

	2006 Revenue Lost From Abandonment Million \$	Final Demand Multipliers Output *	Final Demand Multipliers Earnings *	Final Demand Multipliers Employment *	OVERALL EFFECT IN FINAL DEMAND			Direct Effect Multipliers Earnings	Direct Effect Multipliers Employment	OIL & GAS INDUSTRY	
					Lost Output Million \$	Lost Earnings Million \$	Lost Employment			Lost Earnings Million \$	Lost Employment
SUBTOTAL	\$793.411	2.0202	0.4203	9.4	\$1,602.876	\$333.499	7,440	0.1750	2.5759	\$138.807	2,044
ALL OTHERS*	\$84.132	2.0127	0.4244	9.3	\$169.336	\$35.706	782	0.1743	2.5889	\$14.665	218
TOTAL	\$878.311	2.0178	0.4204	9.4	\$1,772.212	\$369.204	8,223	0.1747	2.5749	\$153.472	2,262

* Weighted averages used for RIMS II Multipliers; excludes Alaska, Federal Offshore production.

Table 5B: Economic Effect of Hypothetical Abandonment of All Marginal Wells

5B.1 Oil

State	2006 Revenue Lost From Abandonment Million \$	Final Demand Multipliers Output	Final Demand Multipliers Earnings	Final Demand Multipliers Employment	OVERALL EFFECT IN FINAL DEMAND			Direct Effect Multipliers Earnings	Direct Effect Multipliers Employment	OIL & GAS INDUSTRY	
					Lost Output Million \$	Lost Earnings Million \$	Lost Employment			Lost Earnings Million \$	Lost Employment
California	\$2,150.449	1.9891	0.4319	9.5	\$4,277.459	\$928.779	20,482	0.1792	3.4506	\$385.338	7,420
Colorado	\$463.184	2.0627	0.4337	8.6	\$955.409	\$200.883	4,000	0.1708	1.8861	\$79.116	874
Kansas	\$1,665.318	1.9466	0.3788	14.1	\$3,241.707	\$630.822	23,501	0.1722	6.9618	\$286.803	11,594
Louisiana	\$864.102	1.8321	0.3628	8.8	\$1,583.121	\$313.496	7,620	0.1570	2.3275	\$135.701	2,011
Mississippi	\$53.145	1.6049	0.3035	9.3	\$85.293	\$16.130	495	0.1469	3.8365	\$7.809	204
New Mexico	\$886.705	1.6563	0.3487	10.0	\$1,468.649	\$309.194	8,897	0.1712	3.7421	\$151.841	3,318
North Dakota	\$130.942	1.7441	0.3538	11.0	\$228.376	\$46.327	1,439	0.1749	4.5305	\$22.899	593
Oklahoma	\$2,592.193	2.0400	0.4224	11.5	\$5,288.074	\$1,094.942	29,728	0.1768	3.1144	\$458.250	8,073
Texas	\$9,043.621	2.0853	0.4334	8.4	\$18,858.663	\$3,919.505	76,278	0.1753	1.5675	\$1,585.112	14,176
Utah	\$108.512	1.8940	0.4018	11.6	\$205.522	\$43.600	1,257	0.1648	3.7026	\$17.878	402
Wyoming	\$439.065	1.7344	0.3242	7.9	\$761.514	\$142.345	3,473	0.1709	2.6753	\$75.037	1,175
SUBTOTAL	\$18,150.336	2.0360	0.4213	9.8	\$36,953.787	\$7,646.024	177,169	0.1766	2.7500	\$3,205.783	49,839
ALL OTHERS*	\$1,978.608	2.0360	0.4213	9.8	\$4,028.446	\$833.588	19,390	0.1766	2.7500	\$349.422	5,441
TOTAL	\$20,135.459	2.0353	0.4211	9.8	\$40,982.233	\$8,479.611	196,559	0.1766	2.7500	\$3,555.205	55,280

5B.2 Gas

State	2006 Revenue Lost From Abandonment Million \$	Final Demand Multipliers Output	Final Demand Multipliers Earnings	Final Demand Multipliers Employment	OVERALL EFFECT IN FINAL DEMAND			Direct Effect Multipliers Earnings	Direct Effect Multipliers Employment	OIL & GAS INDUSTRY	
					Lost Output Million \$	Lost Earnings Million \$	Lost Employment			Lost Earnings Million \$	Lost Employment
California	\$29.397	1.9891	0.4319	9.5	\$58.474	\$12.697	280	0.1792	3.4506	\$5.268	101
Colorado	\$614.875	2.0627	0.4337	8.6	\$1,268.303	\$266.671	5,310	0.1708	1.8861	\$105.026	1,160
Kansas	\$1,018.741	1.9466	0.3788	14.1	\$1,983.081	\$385.899	14,377	0.1722	6.9618	\$175.449	7,092
Louisiana	\$398.326	1.8321	0.3628	8.8	\$729.774	\$144.513	3,513	0.1570	2.3275	\$62.554	927
Mississippi	\$68.549	1.6049	0.3035	9.3	\$110.015	\$20.805	639	0.1469	3.8365	\$10.072	263
New Mexico	\$614.222	1.6563	0.3487	10.0	\$1,017.337	\$214.179	6,163	0.1712	3.7421	\$105.181	2,298
North Dakota	\$5.085	1.7441	0.3538	11.0	\$8.869	\$1.799	56	0.1749	4.5305	\$0.889	23
Oklahoma	\$1,116.970	2.0400	0.4224	11.5	\$2,278.619	\$471.808	12,810	0.1768	3.1144	\$197.459	3,479
Texas	\$2,119.420	2.0853	0.4334	8.4	\$4,419.626	\$918.557	17,876	0.1753	1.5675	\$371.479	3,322
Utah	\$100.102	1.8940	0.4018	11.6	\$189.593	\$40.221	1,159	0.1648	3.7026	\$16.493	371
Wyoming	\$598.730	1.7344	0.3242	7.9	\$1,038.437	\$194.108	4,736	0.1709	2.6753	\$102.324	1,602
SUBTOTAL	\$6,856.748	1.9108	0.3896	9.8	\$13,102.127	\$2,671.257	66,918	0.168	3.0100	\$1,152.193	20,638
ALL OTHERS*	\$4,198.210	1.9108	0.3896	9.8	\$8,021.940	\$1,635.623	41,142	0.168	3.0100	\$705.299	12,637
TOTAL	\$11,128.351	1.8982	0.3870	9.7	\$21,124.068	\$4,306.880	108,060	0.1669	2.9900	\$1,857.493	33,275

5B.3 Oil & Gas

	2006 Revenue Lost From Abandonment Million \$	Final Demand Multipliers Output*	Final Demand Multipliers Earnings*	Final Demand Multipliers Employment*	OVERALL EFFECT IN FINAL DEMAND			Direct Effect Multipliers Earnings	Direct Effect Multipliers Employment	OIL & GAS INDUSTRY	
					Lost Output Million \$	Lost Earnings Million \$	Lost Employment			Lost Earnings Million \$	Lost Employment
SUBTOTAL	\$25,007.084	2.0017	0.4126	9.8	\$50,055.914	\$10,317.281	244,086	0.1743	2.8183	\$4,357.976	70,478
ALL OTHERS*	\$6,176.819	1.9509	0.3998	9.8	\$12,050.387	\$2,469.210	60,533	0.1708	2.9267	\$1,054.722	18,078
TOTAL	\$31,263.811	1.9865	0.4090	9.7	\$62,106.301	\$12,786.491	304,619	0.1731	2.8325	\$5,412.698	88,555

* Weighted averages used for RIMS II Multipliers; excludes Alaska, Federal Offshore production.

Marginal Wells: Fuel For Economic Growth

Severance and Ad Valorem Tax

RIMS II multipliers do not take into consideration any impact on state or local government. Therefore, the economic impact predictions do not include any payments of state or local severance taxes or any local ad valorem taxes. Many states have reduced severance tax rates for wells that qualify for stripper or marginal status under their guidelines. For the purposes of this report, it was assumed that all of the marginal production reported for a given

state would qualify for stripper/marginal status tax reductions at the lowest level of status granted. No additional tax reductions for secondary or tertiary production were assumed for the states that grant such reductions. Several states have additional taxes levied on production for the purpose of funding conservation, environmental or maintenance related activities. These taxes have been included in the severance tax calculations. Based on the average oil and gas prices and marginal production from Table 6, severance taxes col-

Table 6: Production Taxes

State	Marginal Oil Severance Tax Rate	Other Taxes (Conservation, Environmental, etc.)	2006 Average Oil \$/Bbl	2006 Production from Marginal Wells (Bbls)	Annual Total Marginal Oil Production Tax Revenue	2006 Lost Production Bbls	Annual Lost Marginal Oil Production Tax Revenue	Marginal Gas Severance Tax Rate
Alabama	6.00%	—	\$63.11	917,537	\$3,474,346	50,146	\$189,883	6.00%
Alaska	15.00%	\$0.034	\$57.03	0	\$0	0	—	10%
Arizona	3.125%	—	\$59.70	30,469	\$56,844	0	\$0	3.125%
Arkansas	4.00%	\$0.045	\$58.67	3,162,057	\$7,563,008	49,802	\$119,117	\$0.003
California	0.00%	\$0.062	\$57.34	37,503,478	\$2,321,053	2,575,553	\$159,398	0.00%
Colorado	0.00%	0.12%	\$63.80	7,259,935	\$555,821	188,221	\$14,410	0.00%
Florida	5.00%	—	\$63.11	425	—	425	—	\$0.509
Illinois	0.00%	—	\$59.70	9,441,470	\$0	482,297	\$0	0.00%
Indiana	1.00%	—	\$59.31	1,737,763	\$1,030,667	50,273	\$29,817	1.00%
Kansas	0.00%	\$0.0273	\$60.74	27,417,150	\$747,666	546,825	\$14,912	0.00%
Kentucky	4.50%	—	\$58.33	1,796,536	\$4,715,638	38,087	\$99,972	4.50%
Louisiana	3.125%	—	\$64.23	13,453,243	\$27,003,181	354,802	\$712,153	\$0.013
Maryland	0.00%	—	\$0.00	0	—	0	—	7.00%
Michigan	4.00%	1%	\$60.89	2,826,374	\$8,604,896	75,106	\$228,662	5.00%
Mississippi	6.00%	\$0.044	\$59.35	895,452	\$3,228,104	15,904	\$57,334	6.00%
Missouri	0.00%	—	\$60.74	86,780	\$0	2,955	\$0	0.00%
Montana	9.00%	0.30%	\$56.69	2,011,555	\$10,605,260	81,908	\$431,831	11.00%
Nebraska	2.00%	1%	\$57.77	1,579,404	\$2,737,265	15,932	\$27,612	3.00%
Nevada	\$0.05	—	\$59.70	0	—	0	—	\$0.001
New Mexico	7.09%	—	\$61.74	14,361,916	\$62,867,363	232,917	\$1,019,564	8.19%
New York	0.00%	—	\$63.51	293,651	\$0	631	\$0	0.00%
North Dakota	5.00%	—	\$56.69	2,309,795	\$6,547,114	106,216	\$301,068	\$0.0772
Ohio	\$0.100	—	\$62.89	4,805,142	\$480,514	34,732	\$3,473	\$0.025
Oklahoma	7.195%	\$0.002	\$63.11	41,074,209	\$186,590,459	652,457	\$2,962,653	7.195%
Oregon	6.00%	—	\$0.00	0	—	0	—	6.000%
Pennsylvania	0.00%	—	\$64.02	3,626,000	\$0	10,450	\$0	0.00%
South Dakota	4.74%	—	\$51.85	54,169	\$133,131	0	\$0	4.74%
Tennessee	3.00%	—	\$58.33	126,956	\$222,160	7,683	\$13,445	3.00%
Texas	4.60%	\$0.1906	\$61.31	147,506,457	\$444,124,979	5,401,855	\$16,264,364	7.50%
Utah	0.00%	0.20%	\$59.70	1,817,620	\$217,024	31,004	\$3,702	0.00%
Virginia	0.50%	—	\$58.33	779	\$227	1,818	\$530	3.00%
West Virginia	5.00%	—	\$63.07	970,802	\$3,061,424	7,411	\$23,370	5.00%
Wyoming	4.00%	0.06%	\$53.25	8,245,343	\$17,826,019	126,353	\$273,168	6.00%
TOTAL	—	—	—	335,312,467	\$794,714,161	11,141,762	\$22,950,439	—

lected for marginal production were about \$1.25 billion during 2006. Furthermore, the production loss from marginal oil and gas well abandonments in 2006 would represent a \$33.8 million loss in severance taxes assuming average marginal production rates.

Ad valorem taxes are property taxes assessed by local government entities, and a marginal well may be subject to multiple overlapping taxing entities. As noted in prior reports, a survey of ad valorem

taxation approaches in oil and gas producing states shows the tax assessment process differs widely among the states and sometimes also within a state, with corresponding varying tax rates. While we are not aware of any published data that allows a reasonable estimate for marginal well ad valorem tax expense, our experience suggests that the ad valorem tax expense is probably a value of similar magnitude to the severance taxes.

Note: many states have different or multiple production level cut-offs in determining stripper status. The rates shown here assume the lowest tax applicable to a stripper well producing at the lowest production level cut-off. Source: www.spee.org.

State	Other Taxes (Conservation, Environmental, etc.)	2006 Average Gas \$/Mcf	2006 Production from Marginal Wells (Mcf)	Annual Total Marginal Gas Production Tax Revenue	2006 Lost Production Mcf	Annual Lost Marginal Gas Production Tax Revenue	Annual Total Marginal Production Tax Revenue	Annual Lost Marginal Production Tax Revenue
Alabama	—	8.13	30,156,913	\$14,706,765	402,878	\$196,474	\$18,181,111	\$386,357
Alaska	\$0.00008	4.16	0	\$0	0	\$0	\$0	\$0
Arizona	—	6.01	43,494	\$8,166	0	\$0	\$65,010	\$0
Arkansas	\$0.005	6.36	18,700,000	\$149,600	85,466	\$684	\$7,712,608	\$119,801
California	\$0.0062	6.53	4,505,285	\$2,788	596,990	\$369	\$2,323,841	\$159,768
Colorado	0.12%	6.51	94,485,949	\$737,850	1,122,138	\$8,763	\$1,293,671	\$23,173
Florida	—	8.13	0	\$0	0	\$0	\$0	\$0
Illinois	—	7.98	184,000	\$0	17,031	\$0	\$0	\$0
Indiana	—	7.98	1,460,491	\$116,533	48,785	\$3,893	\$1,147,200	\$33,710
Kansas	\$0.0058	5.70	178,670,000	\$1,041,646	3,053,417	\$17,801	\$1,789,312	\$32,713
Kentucky	—	5.99	91,500,000	\$24,667,252	413,057	\$111,355	\$29,382,889	\$211,327
Louisiana	—	7.64	52,154,475	\$678,008	1,259,010	\$16,367	\$27,681,189	\$728,521
Maryland	—	6.51	20,878	\$9,511	0	\$0	\$9,511	\$0
Michigan	1%	4.64	80,800,000	\$22,504,509	375,931	\$87,254	\$31,109,404	\$315,915
Mississippi	\$0.005	7.23	9,486,746	\$4,160,385	7,738	\$3,393	\$7,388,489	\$60,728
Missouri	—	0.00	28,935,586	\$0	790,244	\$0	\$0	\$0
Montana	0.30%	5.75	823,851	\$535,702	0	\$0	\$11,140,962	\$431,831
Nebraska	1%	3.76	0	\$0	0	\$0	\$2,737,265	\$27,612
Nevada	—	6.01	0	\$0	0	\$0	\$0	\$0
New Mexico	—	6.05	101,488,431	\$50,304,813	1,633,331	\$809,594	\$113,172,176	\$1,829,158
New York	—	6.81	10,170,315	\$0	23,969	\$0	\$0	\$0
North Dakota	—	7.36	691,183	\$53,359	31,417	\$2,425	\$6,600,473	\$303,494
Ohio	—	7.64	71,382,588	\$1,784,565	782,368	\$19,559	\$2,265,079	\$23,032
Oklahoma	\$0.0001	6.31	176,878,538	\$80,383,670	4,579,164	\$2,080,575	\$266,974,128	\$5,043,227
Oregon	—	3.72	0	\$0	0	\$0	\$0	\$0
Pennsylvania	—	7.64	156,705,000	\$0	157,492	\$0	\$0	\$0
South Dakota	—	6.52	399,891	\$123,516	0	\$0	\$256,647	\$0
Tennessee	—	8.36	1,792,984	\$449,917	78,217	\$19,627	\$672,077	\$33,072
Texas	\$0.0033	6.61	320,508,067	\$160,024,732	13,076,416	\$6,485,269	\$604,149,711	\$22,749,633
Utah	0.20%	6.27	15,962,409	\$200,204	412,387	\$5,172	\$417,228	\$8,874
Virginia	—	0.00	2,404,616	\$0	612,941	\$0	\$227	\$530
West Virginia	—	7.64	158,446,233	\$60,506,142	939,650	\$358,826	\$63,567,566	\$382,196
Wyoming	0.06%	6.01	99,649,661	\$36,283,036	1,623,709	\$591,202	\$54,109,055	\$864,370
TOTAL	—	—	1,708,407,584	\$459,432,669	32,123,747	\$10,818,602	\$1,254,146,830	\$33,769,042

Conclusion

In 2006, total domestic production, including Alaska and the federal offshore areas was 1.88 billion barrels of oil and 19.38 trillion cubic feet of gas.

Marginal oil production accounted for 335 million barrels or 17.8 percent of total oil. Marginal gas production accounted for 1.71 TCF or 8.8 percent of total gas production. The use of RIMS II multipliers show that every dollar of marginal oil and gas production creates an additional \$1.01775 of economic activity throughout the economy, and that 9.4 jobs are dependent on every \$1 million of marginal oil and gas produced.

A very large portion of the current drilling in the

U.S. involves tight gas reservoirs in the Rocky Mountain region and shale gas reservoirs in the mid-continent region. We have seen an increase in marginal gas wells and should expect to see more such increases in the foreseeable future.

Higher prices, while detrimental to consumers, does have the advantage of making our domestic marginal oil and gas industry more stable.

The cumulative impact of marginal production over the 15 years this economic report has been prepared is summarized in Table 7 – 7.69 billion barrels of oil equivalent production has been achieved from these marginal producers. The lost output of the wells abandoned during this time would have represented \$11.4 billion of economic activity and almost 58,000 jobs.

Table 7: Marginal Wells Cumulative Impact on U.S. Economy

7.1 Oil

Year	No. of Marginal Wells	Marginal Well Production Million Bbls	Abandonments	Avg. Daily Production Per Well (BOPD)	Lost Annual Production Million Bbls	Lost Output Million \$	Lost Earnings Million \$	Lost Employment	Lost Severance Taxes Million \$
1992	453,277	368.132	16,211	2.2	15.659	\$416.935	\$55.372	2,385	\$10.443
1993	452,248	355.961	16,914	2.2	15.210	357.783	47.614	2,026	10.101
1994	442,500	339.930	17,896	2.1	16.153	359.506	48.065	2,019	10.577
1995	433,048	332.288	16,389	2.1	15.322	374.833	50.019	2,133	10.310
1996	428,842	323.468	16,674	2.1	16.452	497.243	66.086	2,829	13.688
1997	420,674	322.090	15,172	2.1	14.049	387.536	51.427	2,220	9.912
1998	406,380	316.870	13,912	2.1	11.984	216.490	28.874	1,231	5.992
1999	410,680	315.514	11,227	2.1	9.616	247.871	33.059	1,483	6.140
2000	411,629	325.947	10,718	2.2	10.122	429.997	57.505	2,333	10.618
2001	403,459	316.099	12,234	2.1	11.295	397.960	53.149	2,268	8.348
2002	402,072	323.777	13,635	2.2	13.157	468.723	62.571	2,621	10.113
2003	393,463	313.748	14,300	2.2	13.844	792.388	164.696	3,783	12.534
2004	397,362	310.922	11,977	2.1	11.305	865.535	179.932	4,028	15.879
2005	401,072	321.762	13,265	2.2	12.656	1,305.654	271.524	6,321	20.533
2006	422,255	335.312	11,738	2.2	11.142	1,359.872	283.951	6,240	22.950
TOTAL	—	4,921.820	212,262	—	197.967	\$8,478.326	\$1,453.844	43,919	\$178.139

7.2 Gas

Year	No. of Marginal Wells	Marginal Well Production Million Bcf	Abandonments	Avg. Daily Production Per Well (MCFD)	Lost Annual Production Bcf	Lost Output Million \$	Lost Earnings Million \$	Lost Employment	Lost Severance Taxes Million \$
1992	—	—	—	—	—	—	—	—	—
1993	—	—	—	—	—	—	—	—	—
1994	159,369	940.421	3,163	16.2	21.256	\$61.758	\$8.112	376	\$1.608
1995	159,669	925.563	3,189	15.9	23.053	51.853	6.771	315	1.518
1996	168,702	986.676	4,671	16.0	39.978	137.092	18.065	804	4.860
1997	189,756	1,042.153	4,661	15.7	35.839	122.772	16.192	729	3.947
1998	199,745	1,104.684	4,203	15.6	29.258	92.721	12.286	549	3.128
1999	207,766	1,138.980	3,546	15.6	24.407	80.846	10.707	481	2.799
2000	223,222	1,258.727	3,534	15.4	23.806	412.340	85.254	1,983	10.819
2001	234,507	1,353.516	3,600	15.8	24.655	397.960	53.149	909	4.716
2002	245,961	1,418.274	3,870	15.8	27.261	128.329	16.997	765	4.335
2003	260,563	1,478.106	3,883	15.5	26.889	274.231	56.033	1,329	6.745
2004	271,856	1,478.106	3,883	15.5	28.978	312.217	64.571	1,530	8.091
2005	288,898	1,760.064	4,517	16.7	31.750	466.695	96.291	2,284	12.378
2006	296,721	1,708.408	4,463	15.8	32.124	412.340	85.254	1,983	10.819
TOTAL	—	13,125.204	42,203	—	305.380	\$2,072.120	\$348.136	9,770	\$52.565

7.3 Oil & Gas

Year	No. of Marginal Wells	Marginal Well Production MMBOE (6:1)	Abandonments	Avg. Daily Production Per Well (BOEPD)	Lost Annual Production Million MMBOE (6:1)	Lost Output Million \$	Lost Earnings Million \$	Lost Employment	Lost Severance Taxes Million \$
1992	453,277	368.132	16,211	2.2	15.659	\$416.935	\$55.372	2,385	\$10.443
1993	452,248	355.961	16,914	2.2	15.210	357.783	47.614	2,026	10.101
1994	601,869	496.667	21,059	4.8	19.695	421.264	56.177	2,395	12.185
1995	592,717	486.549	19,578	4.7	19.164	426.686	56.790	2,448	11.828
1996	597,544	487.914	21,345	4.7	23.115	634.335	84.151	3,633	18.548
1997	610,430	495.782	19,833	4.7	20.023	510.308	67.619	2,949	13.859
1998	606,125	500.984	18,115	4.7	16.861	309.211	41.160	1,780	9.120
1999	618,446	505.344	14,773	4.7	13.684	328.717	43.766	1,964	8.939
2000	634,851	535.735	14,252	4.7	14.090	842.337	142.758	4,316	21.437
2001	637,966	541.685	15,834	4.8	15.404	795.920	106.298	3,177	13.064
2002	648,033	560.156	17,505	4.8	17.701	597.052	79.568	3,386	14.448
2003	654,026	560.099	18,183	4.8	18.326	1,066.619	220.729	5,112	19.278
2004	669,218	557.273	15,860	4.7	16.135	1,177.753	244.503	5,558	23.971
2005	689,970	615.105	17,782	5.0	17.947	1,772.349	367.814	8,604	32.911
2006	718,976	620.047	16,201	4.8	16.496	1,772.212	369.204	8,223	33.769
TOTAL	—	7,687.433	263,445	—	259.509	\$11,429.481	\$1,983.524	57,956	\$253.901

Appendices

Appendix A: RIMS Background

The U.S. Department of Commerce's Bureau of Economic Analysis prepares regional input-output multipliers that allow the estimation of the total economic impact of the addition or removal of industries or projects to a given region. The IOGCC's annual Marginal Well Report uses these multipliers to investigate the economic impact of marginal well production on 11 states and extrapolates those findings to determine the economic impact of marginal oil and gas well abandonments to both the overall economy and the oil and gas industry specifically.

Recognizing the need for a basis of estimating the economic impacts of projects and programs on a regional basis, the Bureau of Economic Analysis developed RIMS (Regional Industrial Multiplier Systems) in the mid-1970s. Enhancements to RIMS in the mid-1980s led to RIMS II (Regional Input-Output Modeling System).

RIMS II multipliers show the interdependence of economic activity throughout a given region, where a region comprises one or more counties. Multipliers are provided for output, earnings and employment, considering final demand and direct effect. These multipliers plus assumptions of projects or programs introductions into a region can be used to calculate variables such as the increase in the output value, i.e. gross receipts or sales. Multipliers plus assumptions

are also instrumental in calculating earnings income such as wages, salaries or proprietor's income less any contributions to private pension funds, and employment levels for all other industries in that region.

In some situations RIMS II multipliers have certain limitations. For instance, the multipliers are best used when total demand changes are relatively small compared to the economy of the region under consideration. Interrelations with adjacent regions are another potential source of error when the regions under consideration are small. The multipliers do not consider the possible subsequent incremental economic activity that may be associated with economic impacts of considerable relative magnitude to a region, although if such activity can be predicted, the RIMS II multipliers can be added for the expected activity to show a cumulative effect. Demand substitution can affect the RIMS II estimates, in that the multipliers assume an adequate supply of resources and labor exists within the region under study. The multipliers are static in the sense that the changes predicted are overall changes with no regard to the timing. The multiplier estimate short-term economic effects that often change over the long term. For example, multipliers may overstate job losses in the long term, as displaced employees find new jobs.

Since RIMS II multipliers are limited to the private sector, they exclude the economic impacts on state and local governments. For the proper consider-

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ation of economic impact from marginal oil and gas production, state severance taxes and local and ad valorem taxes must be added to any estimates derived from RIMS II.

The U.S. Department of Commerce Bureau of Economic Analysis was able to provide the RIMS II multipliers for the 12 largest oil producing states: Alaska, California, Colorado, Kansas, Louisiana, Mississippi, New Mexico, North Dakota, Oklahoma, Texas, Utah and Wyoming. However, Alaska has no marginal well production reported. Its inclusion in U.S. production statistics can significantly skew the analysis results, due to the large volume of North Slope production with its corresponding low wellhead value. Therefore, Alaska is excluded in the IOGCC analysis. The remaining 11 states used for this study (referred to as the “survey states”) account for the majority of marginal oil and gas production. Average values applied for the remaining states reflect weighted averages.

The use of state level RIMS II multipliers is most accurate when the economic activity is evenly distributed across the state. This appears to be a reasonable assumption for the majority of the states considered in this study. In California, the oil and gas industry is not evenly distributed and significant other economic activity is present. These factors suggest that the potential for error in the RIMS II estimate is greater for states such as California, whereas accuracy should

be better in states with more evenly geographically distributed production, such as Louisiana.

Since the RIMS II multipliers used for this study are aggregations of regional data at the state level, it is expected that any errors introduced by the limitations previously discussed will be minimized. While RIMS II does not consider timing, many of the effects predicted in this report are based on annual values. It would follow that some portions of the predicted areas impacted, such as annual severance tax collections, could be considered as time dependent.

All previous editions of this report utilized RIMS II factors that were calculated from data gathered in the late 1980s. The U.S. Department of Commerce released updated RIMS II factors in April 2004, and these updated factors were used in this report. The old factors were aggregated into industry 8.000, Crude Petroleum and Natural Gas. The new factors are grouped into Industry 211000, Oil and Gas Extraction. The new factors are generally higher than the old factors, showing that the industry activity has a larger impact on the overall economy than what would have been calculated using the old factors. Because of the time interval between the development of the multipliers and the possible changes in the scope of what is encompassed in the industry category, it cannot be determined to what extent the old multipliers are directly comparable with the new.

Appendix B: Sources

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