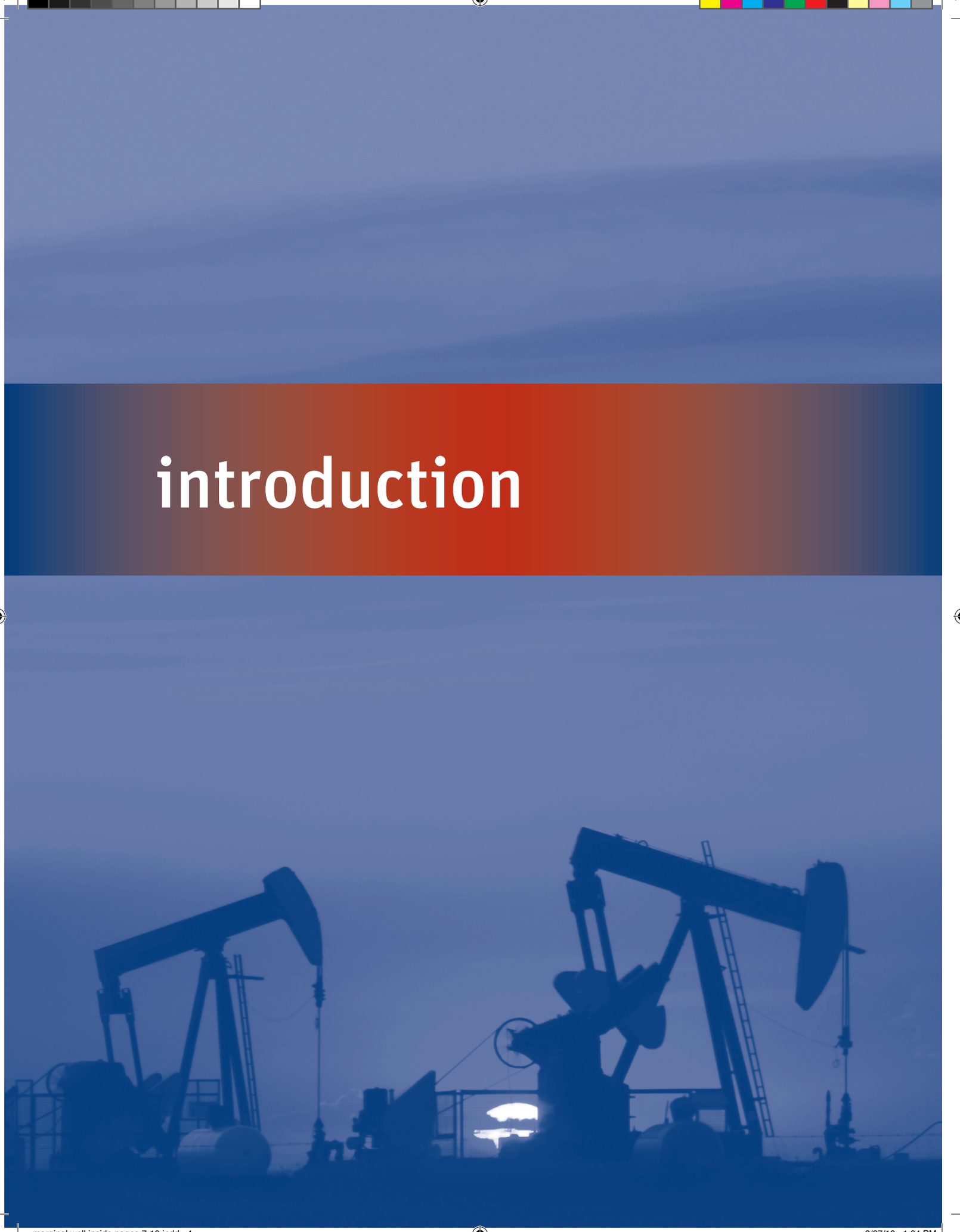
marginal wells:
fuel for economic growth

2009 report

contents

introduction



introduction

For more than 65 years, the Interstate Oil and Gas Compact Commission (IOGCC) has championed the preservation of this country's low-volume, marginal wells and documented their production. The IOGCC recognizes that it goes to the heart of conservation values to do all that is possible to productively recover the scarce oil and natural gas resources marginal wells produce.

The IOGCC defines a marginal (stripper) well as a well the produces 10 barrels of oil or 60 Mcf of natural gas per day or less. Generally, these wells started their productive life producing much greater volumes using natural pressure. Over time, the pressure decreases and production drops. That is not to say that the reservoirs which feed the wells are necessarily depleted. It has been estimated that in many cases marginal wells may be accessing a reservoir which stills holds two-thirds of its potential value.

However, because these resources are not always easily or economically accessible, many of the marginal wells in the United States are at risk of being prematurely abandoned, leaving large quantities of oil or gas behind.

In addition to supplying much-needed energy, marginal wells are important to communities across the country, providing jobs and driving economic activity.

Today, as the nation ponders the solution to its energy challenges, the commission continues to tell the story of how tiny producing wells can collectively contribute to a sound energy and economic future.

definitions

definitions

Marginal Well. A producing well that requires a higher price per MCF or per barrel of oil to be worth producing, due to low production rates and/or high production costs from its location (e.g. far offshore; in deep waters; onshore far from good roads for oil pickup and no pipeline) and/or its high co-production of substances that must be separated out and disposed of (e.g. saline water, non-burnable gasses mixed with the natural gas). A Marginal Well becomes unprofitable to produce whenever oil and/or gas prices drop below its crucial profit point. On land, this is often but not always a stripper well.

Stripper Well. An oil well whose maximum daily average oil production does not exceed 10 bbls oil per day during any consecutive 12 month period. Often used interchangeably with the term "Marginal Well", although they are not the same.

Temporary Abandonment. "Cessation of work on a well pending determination of whether it should be completed as a producer or permanently abandoned." (Williams & Meyers)

Idle Well. (1) A well that is not producing or injecting, and has received state approval to remain idle. or (2) a well that is not producing or injecting, has not received state approval to remain idle, and for which the operator is known or solvent. (IOGCC)

Plugged and Abandoned. Wells that have had plugging operations during the calendar year. Does not include wells that have been plugged back up-hole in order to kick the well, etc. This category does not necessarily exclude those with site restoration remaining to be completed.

marginal oil

marginal oil

National Marginal Oil Well Survey*
2008 Calendar Year

State	Number of Marginal Oil Wells	Production from Marginal Oil Wells (Bbls)	Oil Wells Plugged and Abandoned	Average Daily Production Per Well (bls)	Total 2008 Oil Production (Bbls)
Alabama	680	1,009,774	1	4.1	7,689,547
Arizona	16	22,514	0	3.9	51,575
Arkansas	4,123	3,075,053	69	2.0	5,913,563
California	31,255	40,600,275	1,471	3.6	238,607,976
Colorado	4,289	3,734,540	240	2.4	10,681,857
Florida	12	28,426	4	6.5	1,957,670
Illinois	25,635	9,000,000	609	1.0	9,500,000
Indiana	4,355	1,672,479	251	1.1	1,858,311
Kansas	17,791	15,316,817	754	2.4	39,586,000
Kentucky	18,576	2,178,114	224	0.3	2,645,193
Louisiana	16,102	11,779,256	146	2.0	72,633,561
Michigan	2,315	3,089,050	58	3.7	5,720,463
Mississippi	1,000	1,094,205	2	3.0	20,533,771
Montana	2,645	2,085,300	47	2.2	31,538,900
Nebraska	1,471	1,644,062	27	3.1	2,393,504
Nevada	37	58,863	2	4.4	436,271
New Mexico	15,385	15,235,619	331	2.7	60,167,768
New York	3,442	397,060	105	0.3	397,060
North Dakota	1,509	2,406,132	12	4.4	62,778,940
Ohio	29,255	5,076,571	197	0.5	5,554,235
Oklahoma	34,985	23,799,316	2,385	1.9	65,268,490
Pennsylvania	19,093	3,600,000	140	0.5	3,600,000
South Dakota	27	47,993	0	4.9	1,696,792
Texas	132,297	107,160,693	508	2.2	350,572,524
Utah	1,611	2,638,738	41	4.5	22,007,858
Virginia	3	1,402	0	1.3	15,712
West Virginia	3,617	679,134	0	0.5	1,184,580
Wyoming	4,063	4,196,568	0	2.8	52,952,216
Totals **	**375,589**	**261,627,954**	**7,624**	**72**	**1,327,818,079**

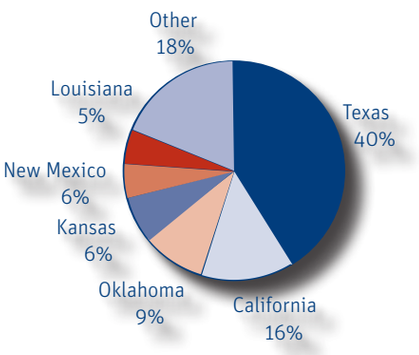
* Numbers are estimates by states, survey respondents are listed in acknowledgement section

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

us state rankings

Number of Marginal Oil Wells	Production from Marginal Oil Wells (Bbls)	Oil Wells Plugged and Abandoned	Average Daily Production Per Well
Texas	Texas	Oklahoma	Florida
Oklahoma	California	California	South Dakota
California	Oklahoma	Kansas	Utah
Ohio	Kansas	Illinois	North Dakota
Illinois	New Mexico	Texas	Nevada
Pennsylvania	Louisiana	New Mexico	Alabama
Kentucky	Illinois	Indiana	Arizona
Kansas	Ohio	Colorado	Michigan
Louisiana	Wyoming	Kentucky	California
New Mexico	Colorado	Ohio	Nebraska
Indiana	Pennsylvania	Louisiana	Mississippi
Colorado	Michigan	Pennsylvania	Wyoming
Arkansas	Arkansas	New York	New Mexico
Wyoming	Utah	Arkansas	Colorado
West Virginia	North Dakota	Michigan	Kansas
New York	Kentucky	Montana	Texas
Montana	Montana	Utah	Montana
Michigan	Indiana	Nebraska	Arkansas
Utah	Nebraska	North Dakota	Louisiana
North Dakota	Mississippi	Florida	Oklahoma
Nebraska	Alabama	Mississippi	Virginia
Mississippi	West Virginia	Nevada	Indiana
Alabama	New York	Alabama	Illinois
Nevada	Nevada	Wyoming	Pennsylvania
South Dakota	South Dakota	West Virginia	West Virginia
Arizona	Florida	South Dakota	Ohio
Florida	Arizona	Arizona	Kentucky
Virginia	Virginia	Virginia	New York

Production from Marginal Oil Wells (Bbls)



State	Production from Marginal Oil Wells (Bbls)
Texas	107,160,693
California	40,600,275
Oklahoma	23,799,316
Kansas	15,316,817
New Mexico	15,235,619
Louisiana	11,779,256
Others	47,735,978

State	2004 Number of Marginal Wells	P f W
Alabama	669	1
Arizona	17	2
Arkansas	3,948	3
California	25,622	3
Colorado	5,605	6
Florida	NR	N
Illinois	16,751	1
Indiana	5,004	1
Kansas	38,363	2
Kentucky	19,129	2
Louisiana	20,576	1
Michigan	2,306	3
Mississippi	478	
Missouri	487	8
Montana	2,335	1
Nebraska	1,450	1
Nevada	NR	N
New Mexico	13,882	1
New York	2,759	1
North Dakota	1,392	2
Ohio	28,918	4
Oklahoma	48,250	4
Pennsylvania	16,061	3
South Dakota	20	3
Tennessee	390	2
Texas	121,490	1
Utah	1,111	1
Virginia	6	1
West Virginia	8,000	1
Wyoming	12,343	8
TOTALS	**397,362**	**3**

comparative number of marginal oil wells and marginal oil well production 2004-2008

of	Production from Marginal Wells (Bbls)	2005 Number of Marginal Wells	2005 Production from Marginal Wells (Bbls)	2006 Number of Marginal Wells	2006 Production from Marginal Wells (Bbls)	2007 Number of Marginal Wells	2007 Production from Marginal Wells (Bbls)	2008 Number of Marginal Wells	2008 Production from Marginal Wells (Bbls)
	1,141,127	665	911,785	677	917,537	693	1,009,557	680	1,009774
	23,746	17	31,432	20	30,469	15	17,721	16	22,514
	3,620,354	4,000	3,317,410	4,000	3,162,057	4,102	3,150,508	4,123	3,075,053
	34,955,831	26,444	35,563,813	28,016	37,503,478	29,460	39,280,587	31,255	40,600,275
	6,316,308	5,982	7,001,499	6,480	7,259,935	6,866	7,170,856	4,289	3,734,540
	NR	NR	NR	NR	NR	2	3,987	12	28,426
	10,040,292	16,407	8,461,222	15,700	9,441,470	25,629	10,000,000	25,635	9,000,000
	1,729,606	5,364	1,594,296	4,943	1,737,763	5,130	1,263,630	4,355	1,672,479
	25,493,168	38,692	25,827,950	54,200	27,417,150	17,020	14,542,290	17,791	15,316,817
	2,005,480	19,012	1,958,015	20,000	1,796,536	18,618	1,796,536	18,576	2,178,114
	14,136,304	20,041	14,152,725	19,338	13,453,243	19,547	19,931,314	16,102	11,779,256
	3,055,339	2,011	2,657,497	2,145	2,826,374	2,205	3,044,541	2,315	3,089,050
	678,566	1,858	895,452	1,858 /	895,452 /	1,302	1,192,175	1,000	1,094,205
	88,053	495	85,406	323	86,780	326	79,515		
	1,879,426	2,424	1,947,855	2,505	2,011,555	2,532	2,017,196	2,645	2,085,300
	1,654,195	1,478	1,598,224	1,487	1,579,404	1,473	1,634,975	1,471	1,644,062
	NR	NR	NR	NR	NR	33	59,203	37	58,863
	13,990,201	14,069	14,065,576	14,552	14,361,916	14,975	14,832,271	15,385	15,235,619
	171,760	2,553	211,292	2,793	293,651	3,559	386,887	3,442	397,060
	2,205,309	1,416	2,217,706	1,457	2,309,795	1,471	2,370,729	1,509	2,406,132
	4,868,915	28,828	4,840,874	28,915	4,805,142	29,120	4,522,244	29,255	5,076,571
	41,427,782	46,798	39,318,486	47,153	30,258,650	45,892	27,911,928	34,985	23,799,316
	3,669,959	16,662	3,652,770	17,350	3,626,000	18,200	3,600,000	19,093	3,600,000
	35,452	27	54,169	27	54,169	30	63,054	27	47,993
	261,984	290	235,127	347	126,956	347	126,956	132,297	107,160,693
	126,260,710	124,116	139,959,142	130,553	147,506,457	130,106	119,683,522		
	1,523,025	1,163	1,618,810	1,407	1,817,620	1,412	2,271,425	1,611	2,638,738
	1,974	3	1,233	3	779	3	1,698	3	1,402
	1,200,000	7,900	1,300,000	3,668	970,802	3,897	838,947	3,617	679,134
	8,487,256	12,357	8,281,804	12,464	8,245,343	12,572	8,263,340	4,063	4,196,568
	310,922,122	**401,072**	**321,761,570**	**422,381**	**324,496,483**	**396,537**	**291,067,592**	**375,589**	**261,627,954**

* Numbers are estimates by states, survey respondents are listed in acknowledgement section

/ no data submitted for 2006, 2005 data used

NR - No response, new to this portion of the survey

marginal gas

marginal gas

National Marginal Natural Gas Well Survey
2008 Calendar Year

State	Number of Marginal Wells	Production from Marginal Gas Wells (Mcf)	Gas Wells Plugged and Abandoned	Average Daily Production Per Well (Mcf)	Total 2008 Gas Prod. (Mcf)
Alabama	3,751	40,353,899	1	8.1	279,450,843
Alaska	0	0	0	20.7	151,304,314
Arizona	3	19,202	0	32.2	523,130
Arkansas	2,224	22,067,600	50	24.0	449,901,336
California	678	5,463,835	48	21.0	296,949,914
Colorado	25,826	280,104,854	706	18.4	1,417,768,858
Illinois	720	180,000	0	18.2	*
Indiana	667	2,350,691	24	0.7	4,701,382
Kansas	16,487	155,826,509	201	24.6	377,386,000
Kentucky	17,479	101,362,982	64	17.5	114,116,089
Louisiana	5,742	50,402,837	61	15.9	1,360,213,375
Michigan	7,567	88,228,804	21	6.0	265,256,686
Mississippi	1,192	10,690,535	6	23.8	100,789,238
Montana	5,093	34,123,251	150	18.2	119,571,800
Nebraska	281	2,522,377	5	5.3	2,835,409
New Mexico	12,844	111,383,175	241	24.6	1,457,217,237
New York	6,272	12,041,408	17	18.2	50,319,577
North Dakota	161	1,234,700	3	15.8	87,192,320
Ohio	34,412	75,014,485	295	27.2	84,858,015
Oklahoma	28,062	329,693,635	1,161	25.9	1,734,285,220
Pennsylvania	55,681	165,576,000	202	29.7	198,295,000
South Dakota	63	363,030	0	26.6	1,098,427
Texas	46,234	372,260,611	225	31.9	6,831,533,324
Utah	1,808	17,530,476	64	22.1	442,076,929
Virginia	372	2,611,817	0	9.7	128,454,245
West Virginia	41,123	109,832,150	*	22.1	245,056,123
Wyoming	7,765	58,696,937	0	0.0	2,489,166,803
Totals	**322,507**	**2,049,935,800**	**3,545**	**508**	**18,693,160,840**

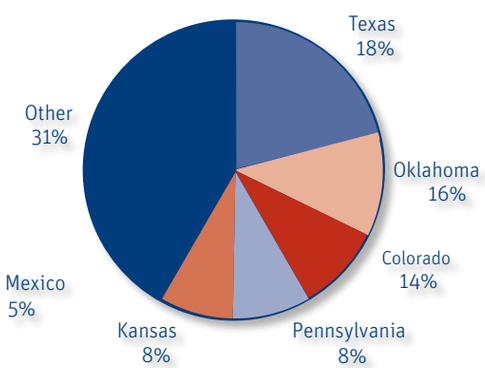
* Numbers are estimates by states, survey respondents are listed in acknowledgement section
** Includes Natural Gas From Coal Seams
# This figure represents only states with Marginal natural gas production; does not include production figures from states without Marginal natural gas production.

us state rankings

Number of Marginal Wells	Production from Marginal Gas Wells (Mcf)	Gas Wells Plugged and Abandoned	Average Daily Production Per Well (Mcf)
Pennsylvania	Texas	West Virginia	Arizona
Texas	Oklahoma	Oklahoma	Texas
West Virginia	Colorado	Colorado	Pennsylvania
Ohio	Pennsylvania	Ohio	Ohio
Oklahoma	Kansas	New Mexico	South Dakota
Colorado	New Mexico	Texas	Oklahoma
Kentucky	West Virginia	Pennsylvania	New Mexico
Kansas	Kentucky	Kansas	Kansas
New Mexico	Michigan	Montana	Arkansas
Wyoming	Ohio	Kentucky	Mississippi
Michigan	Wyoming	Utah	West Virginia
New York	Louisiana	Louisiana	Utah
Louisiana	Alabama	Arkansas	California
Montana	Montana	California	Alaska
Alabama	Arkansas	Indiana	Colorado
Arkansas	Utah	Michigan	Montana
Utah	New York	New York	New York
Mississippi	Mississippi	Mississippi	Illinois
Illinois	California	Nebraska	Kentucky
California	Virginia	North Dakota	Louisiana
Indiana	Nebraska	Alabama	North Dakota
Virginia	Indiana	Wyoming	Virginia
Nebraska	North Dakota	Virginia	Alabama
North Dakota	South Dakota	South Dakota	Michigan
South Dakota	Illinois	Illinois	Nebraska
Arizona	Arizona	Arizona	Indiana
			Wyoming

State	2004 Number of Marginal Wells
Alabama	2,194 **
Arizona	2
Arkansas	1,913 *
California	490
Colorado	7,780
Illinois	409
Indiana	2,386
Kansas	8,169
Kentucky	16,495
Louisiana	9,784
Maryland	7
Michigan	5,396
Mississippi	548
Montana	3,926
Nebraska	102
New Mexico	10,142
New York	5,710
North Dakota	58
Ohio	33,404
Oklahoma	23,845 **
Pennsylvania	43,906
South Dakota	57
Tennessee	270
Texas	35,240
Utah	1,225
Virginia	228
West Virginia	38,500
Wyoming	19,670 **
TOTALS	**271,856**

Production from Marginal Gas Wells (Mcf)



State	Production from Marginal Gas Wells (Mcf)
Texas	372,260,611
Oklahoma	329,693,635
Colorado	280,104,854
Pennsylvania	165,576,000
Kansas	155,826,509
New Mexico	111,383,175
Others	635,091,016

comparative number of marginal gas wells and marginal gas well production 2004-2008

		2005		2006		2007		2007	
of	Production from Marginal Wells (Mcf)	Number of Marginal Wells	Production from Marginal Wells (Mcf)	Number of Marginal Wells	Production from Marginal Wells (Mcf)	Number of Marginal Wells	Production from Marginal Wells (Mcf)	Number of Marginal Wells	Production from Marginal Wells (Mcf)
	22,895,790**	2,620 **	26,757,739**	3,069 **	30,156,913 **	3,359 **	35,753,795**	3,751	40,353,899
	10,987	2	17,212	3	43,494	3	28,470	3	19,202
	16,923,448	2,114	18,707,824	2,188	18,700,000	2,018	23,851,578	2,224	22,067,600
	4,247,011	527	4,428,540	566	4,505,285	618	5,087,304	678	5,463,835
	79,619,265	8,861	88,788,233	9,599	94,485,949	10,740	102,321,123	25,826	280,104,854
	184,000	551	184,000	551 /	184,000 /	730	184,000	720	180,000
	3,401,445	2,110	3,134,583	479	1,460,491	450	1,802,991	667	2,350,691
	101,394,727	15,120	283,712,000	13,868	178,670,000	15,110	141,869,241	16,487	155,826,509
	83,777,212	16,618	82,323,314	17,500	91,500,000	16,618	84,669,314	17,479	101,362,982
	44,477,263	10,035	42,130,824	9,942	52,154,475	10,226	44,410,061*	5,742	50,402,837
	33,391	7	36,468	8	20,878	10	39,613		
	70,864,267	6,003	77,388,412	6,448	80,800,000	7,080	80,800,000	7,567	88,228,804
	6,345,386	1,226	9,486,746	1,226 /	9,486,746 /	1,123	9,729,948	1,192	10,690,535
	26,484,418	4,162	27,426,557	4,577	28,935,586	4,926	31,373,986	5,093	34,123,251
	782,502	108	720,360	109	823,851	190	1,233,935	281	2,522,377
	91,910,687	10,858	97,358,159	11,433	101,488,431	12,267	105,336,679	12,844	111,383,175
	10,261,189	5,607	9,896,329	5,516	10,170,315	6,066	11,411,681	6,272	12,041,408
	300,815	68	401,057	88	691,183	135	1,181,897	161	1,234,700
	72,539,000	33,355	68,267,000	33,576	71,382,588	33,960	67,630,326	34,412	75,014,485
*	203,812,145**	18,706 **	169,439,950**	20,528 **	184,790,656 **	22,038 **	195,509,065**	28,062	329,693,635
	136,394,002	46,654	151,651,000	49,750	156,705,000	52,700	152,200,000	55,681	165,576,000
	455,296	50	399,891	50	399,891	63	399,907	63	363,030
	1,936,268	315	2,200,000	298	1,792,984	298	1,792,984		
	284,361,426	37,396	302,083,547	40,099	320,508,067	45,119	373,718,449	46,234	372,260,611
	12,854,032	1,419	14,429,074	1,587	15,962,409	1,797	17,781,462	1,808	17,530,476
	3,050,649	285	3,651,691	357	2,404,616	482	3,625,593	372	2,611,817
	185,000,000	40,900	186,000,000	43,336	158,446,233	44,420	165,994,559	41,123	109,832,150
*	75,643,874**	23,221 **	89,043,042**	27,249	99,649,661	29,614 **	103,854,785**	7,765	58,696,937
	1,539,960,495	**288,898**	**1,760,063,552**	**304,000**	**1,716,319,702**	**322,160**	**1,763,592,746**	**322,507**	**2,049,935,800**

* Estimated
** Includes natural gas from coal seams
/ no data submitted for 2006, 2005 data used

economic analysis

economic impact of marginal wells in the United States calendar year 2008

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Marginal well production is a significant factor in the domestic energy picture. Marginal wells are those that produce less than 10 barrels of oil per day or less than 60,000 cubic feet of gas per day. The Interstate Oil and Gas Compact Commission (IOGCC) has monitored production from these wells since the 1940s.I Individual wells contribute only a small amount of oil (about 2.5 barrels per day nationally in 2008) but there were more than 375,000 of these wells in the United States, about 5 percent fewer than in 2007. Combined, these marginal wells produced almost 262 million barrels of oil in 2008 – about 20 percent of U.S. production[1]. Marginal gas wells numbered more than 322,000 in 2008 (about the same as the prior year) and produced about 2.1 trillion cubic feet of natural gas (a 23 percent increase over the previous year) – about 19 percent of total U.S. production[2].

The Energy Policy Act of 2005 provided little encouragement for producers of these marginal wells. The act allows royalty relief for production from federal lands, but this occurs only if prices fall below $15 per barrel or $2 per mmbtu – prices unlikely to occur even in these difficult economic times. According to the Energy Information Administration, average prices during 2008 were $99.57 per barrel of oil and $8.07 per mcf of natural gas.

Some states have enacted incentive programs intended to promote production from marginal wells, but there is no broad agreement regarding the necessity of these incentives. In the face of current crude oil and natural gas prices, many of these wells may be abandoned, and their contribution to domestic production levels halted. As the country attempts to expand its level of energy independence and recovery from the economic downturn, small marginal well operators can supply jobs and boost tax revenues that increase many states' budgets. Production from these wells is, by definition, marginal, however, their aggregate influence is significant in terms of revenue, employment, and earnings.The following is a summary of these benefits and potential losses.

development of the report

The IOGCC surveys its member states annually to acquire data related to marginal well production. While states report the same information --- including production figures, number of wells, and types of wells --- each state has its own approach for calculating the data. These approaches also may vary over time. Thus, while year-to-year comparisons of these reports are useful, the differences in reporting and collecting

1 According to IOGCC survey estimates for total oil production.
2 According to IOGCC survey estimates for total gas production.

data should be noted. Production figures, numbers of wells producing or abandoned and other information gathered from this survey are used here. There are many other groups and government agencies that collect data related to the oil and gas industry, particularly pricing information. For that reason, this report uses sound statistical methodology where anomalies in collection practices exist. And for consistency in this report, we use the U. S. Energy Information Agency (EIA) pricing information[3].

Marginal production of either oil or natural gas occurs in 29 states from Alabama to Wyoming. Texas has more than 132,000 marginal oil wells and more than 46,000 marginally producing natural gas wells. Arizona, on the other hand, reported only 16 marginal oil wells and 3 marginal natural gas wells. The state of Alaska reports no marginal wells of either kind.

hydrocarbon production by state

Table 1 contains information reported by each state relative to total production[4]. According to surveys received by the IOGCC, total production in the U.S. for calendar 2008 was 1.3 billion barrels of crude oil and 18.7 trillion cubic feet of natural gas. Table 2 shows marginal oil and gas

3 We use the annual average EIA reported WTI spot price FOB Cushing, OK for oil and average wellhead prices for natural gas. For crude oil, that price was $99.57 during 2008; natural gas was $8.07 per mcf

4 Note that this report is based on survey-reported numbers by state agencies and may not match other data sources such as the EIA. Also, some states did not report production data for 2008.

table

Bbls	Oil - Bbls Mcf	Gas - Mcf Oil Wells	Stripper Oil
Alabama	7,689,547	279,450,843	1,009,774
Alaska	249,873,742	121,591,569	0
Arizona	51,575	503,037	22,514
Arkansas	5,913,563	449,901,336	3,075,053
California	238,607,976	296,949,914	40,600,275
Colorado	10,681,857	1,417,768,858	3,734,540
Florida	1,957,670	2,835,069	28,426
Illinois	9,500,000	* 9,000,000	180,000
Indiana	1,858,311	4,701,382	1,672,479
Kansas	39,586,000	377,386,000	15,316,817
Kentucky	2,645,193	114,116,089	2,178,114
Louisiana	72,633,561	1,360,213,375	11,779,256
Maryland	*	* *	*
Michigan	5,720,463	265,256,686	3,089,050
Mississippi	20,533,771	100,789,238	1,094,205
Montana	31,538,900	119,571,800	2,085,300
Nebraska	2,393,504	2,835,409	1,644,062
Nevada	436,271	4,177	58,863
New Mexico	60,167,768	1,457,217,237	15,235,619
New York	397,060	50,319,577	397,060
North Dakota	62,778,940	87,192,320	2,406,132
Ohio	5,554,235	84,858,015	5,076,571
Oklahoma	65,268,490	1,734,285,220	23,799,316
Pennsylvania	3,600,000	198,295,000	3,600,000
South Carolina	0	0 0	0
South Dakota	1,696,792	10,908,621	47,993
Texas	350,572,524	6,831,533,324	107,160,693
Utah	22,007,858	442,076,929	2,638,738
Virginia	15,712	128,454,245	1,402
West Virginia	1,184,580	245,056,123	679,134
Wyoming	52,952,216	2,489,166,803	4,196,568
Totals	**1,327,818,079**	**18,673,238,196**	**261,627,954**
***Not Reported**			

ble 1 - total production by state - 2008

	Stripper Gas Gas Wells	Stripper	BOPD	Stripper	MCFPD	Oil Price 99.572	Gas Price 8.068	Stripper Oil Value Million $	Stripper Gas Value Million $
	40,353,899	680	4.1	3,751	29.5			100.54	325.56
	0	0	na	0	na			NA	NA
	19,202	16	3.9	3	17.5			2.24	0.15
	22,067,600	4,123	2.0	2,224	27.2			306.19	178.03
	5,463,835	31,255	3.6	678	22.1			4,042.64	44.08
	280,104,854	4,289	2.4	25,826	29.7			371.85	2,259.75
	*	12	6.5	*	*			2.83	*
	25,635	1.0	720	0.7				896.15	1.45
	2,350,691	4,355	1.1	667	9.7			166.53	18.96
	155,826,509	17,791	2.4	16,487	25.9			1,525.12	1,257.13
	101,362,982	18,576	0.3	17,479	15.9			216.88	817.75
	50,402,837	16,102	2.0	5,742	24.0			1,172.88	406.62
	*	*	*	*				*	*
	88,228,804	2,315	3.7	7,567	31.9			307.58	711.79
	10,690,535	1,000	3.0	1,192	24.6			108.95	86.25
	34,123,251	2,645	2.2	5,093	18.4			207.64	275.29
	2,522,377	1,471	3.1	281	24.6			163.70	20.35
	0	37	4.4	0	0.0			5.86	0.00
	111,383,175	15,385	2.7	12,844	23.8			1,517.04	898.58
	12,041,408	3,442	0.3	6,272	5.3			39.54	97.14
	1,234,700	1,509	4.4	161	21.0			239.58	9.96
	75,014,485	29,255	0.5	34,412	6.0			505.48	605.18
	329,693,635	34,985	1.9	28,062	32.2			2,369.74	2,659.80
	165,576,000	19,093	0.5	55,681	8.1			358.46	1,335.78
	0	0.0	0	0.0				0.00	0.00
	363,030	27	4.9	63	15.8			4.78	2.93
	372,260,611	132,297	2.2	46,234	22.1			10,670.17	3,003.21
	17,530,476	1,611	4.5	1,808	26.6			262.74	141.43
	2,611,817	3	1.3	372	19.2			0.14	21.07
	109,832,150	3,617	0.5	41,123	7.3			67.62	886.07
	58,696,937	4,063	2.8	7,765	20.7			417.86	473.54
	2,049,935,800	**375,589**	**2.5**	**322,507**	**18.2**			**26,050.73**	**16,537.86**
	2,049,935,800								
								3352.06	
	2,049,935,800,000								**16,000,000,000**

table 2 - economic impact of stripper production

Overall Effect in Final Demand Oil and Gas Industry

	Final Demand Multipliers Output	Final Demand Multipliers Earnings	Final Demand Employment Employment	Lost Multipliers Earnings	Production Employment
California	1.989	0.432	9.5	0.179	3.451
Colorado	2.063	0.434	8.6	0.171	1.886
Kansas	1.947	0.379	14.1	0.172	6.962
Louisiana	1.832	0.363	8.8	0.157	2.328
Mississippi	1.605	0.304	9.3	0.147	3.837
New Mexico	1.656	0.349	10.0	0.171	3.742
North Dakota	1.744	0.354	11.0	0.175	4.531
Oklahoma	2.040	0.422	11.5	0.177	3.114
Texas	2.085	0.433	8.4	0.175	1.567
Utah	1.894	0.402	11.6	0.165	3.703
Wyoming	1.734	0.324	7.9	0.171	2.675
SUBTOTAL	2.033	0.424	9.3	0.176	2.560
ALL OTHERS*	2.033	0.424	9.3	0.176	2.560
TOTAL	**2.033**	**0.424**	**9.3**	**0.176**	**2.560**

production by state for 2008. Almost 262 million barrels of crude oil and 2.1 trillion cubic feet of natural gas were produced by marginal, or stripper, wells. On average, these marginal wells produced 2.5 barrels of oil and 18.2 thousand cubic feet per day; with a low of 0.3 BOPD in New York and a high of 6.5 BOPD from Florida wells. Natural gas production from stripper wells had an equally diverse range of production – 0.7 MCFPD in Indiana and 32.2 MCFPD in Arizona. As stated above, marginal wells provide about 20 percent of overall domestic production.

impact of marginal oil and natural gas production on the u.s. economy

Economic impact studies generally examine the direct and indirect effects of new businesses or industries entering local, state, or regional markets. For example, if a new *Bass Pro Shop* moved into a city, what effect on local demand, salaries, and employment might that occurrence have on the city's economy? Obviously, the new firm would hire additional people, pay new salaries and generate new revenues for the city. But because those new employees would buy things from other existing businesses in the area and the new company would purchase supplies from local businesses, the *Bass Pro Shop* would have additional indirect effects on the area economy. Economists call these multiplier effects. For purposes of this report, we measure these multiplier effects using RIMS II (Regional Industrial Multiplier System) multipliers provided by the Department of Commerce's Bureau of Economic Analysis.

The RIMS II multipliers, which are used to quantify the economic impact of marginal gas and oil well abandonments, are listed in Table 3. These values are taken from last years' report. Holding price levels constant, these multipliers represent the regional

total production by state

State	Oil - Bbls	Gas - Mcf
Alabama	7,689,547	279,450,843
Alaska	249,873,742	151,304,314
Arizona	51,575	523,130
Arkansas	5,913,563	449,901,336
California	238,607,976	296,949,914
Colorado	10,681,857	1,417,768,858
Florida	1,957,670	2,835,069
Illinois	9,500,000	*
Indiana	1,858,311	4,701,382
Kansas	39,586,000	377,386,000
Kentucky	2,645,193	114,116,089
Louisiana	72,633,561	1,360,213,375
Maryland	* *	
Michigan	5,720,463	265,256,686
Mississippi	20,533,771	100,789,238
Montana	31,538,900	119,571,800
Nebraska	2,393,504	2,835,409
Nevada	436,271	4,177
New Mexico	60,167,768	1,457,217,237
New York	397,060	50,319,577
North Dakota	62,778,940	87,192,320
Ohio	5,554,235	84,858,015
Oklahoma	65,268,490	1,734,285,220
Pennsylvania	3,600,000	198,295,000
South Carolina	0	0
South Dakota	1,696,792	1,098,427
Texas	350,572,524	6,831,533,324
Utah	22,007,858	442,076,929
Virginia	15,712	128,454,245
West Virginia	1,184,580	245,056,123
Wyoming	52,952,216	2,489,166,803
Totals	**1,327,818,079**	**18,693,160,840**

*Not Reported

economic impact that results from a change in demand, which, in this case, is the revenue lost from abandonment. The final demand multipliers for output, earnings, and employment that are shown include not only effects for the oil and gas industry, but secondary and supporting industries as well. Examples of these secondary industries may include, but are not limited to, businesses such as healthcare and retailers. Please refer to the Appendix below for a more thorough discussion of the multiplier concept.

A simple way of looking at the significance of marginal wells to United States production is to examine the impact of stripper wells actually abandoned during 2008. Table 2 shows these results. There were almost 8,000 stripper oil wells abandoned with a market production value of about $338 million[5]. Additionally, there were more 3,500 marginal gas wells abandoned having a value of more than $122 million. The total value of all marginal wells abandoned in the U.S. in 2008 therefore totals $460 million – a significant economic impact, particularly at the state level. The abandonment of stripper wells is reflected in lower state revenues from severance taxes, lower profits to firms and higher levels of unemployment, particularly in the oil and natural gas industry. We examine some of these effects in the following analysis.

5 This assumes that each abandoned well produced at the state's average marginal well rate for half the year.

stripper production

	Stripper Oil - Bbls	Stripper Gas - Mcf	Average BOPD	Average MCFPD	Abandoned Oil Wells	Estimated Production	Estimated Value - Oil (BBLS)	A G
Alabama	1,009,774	40,353,899	4.1	8.1	1	4	72,917	1
Alaska	0	0	na	20.7	0	0	0	0
Arizona	22,514	19,202	3.9	32.2	0	0	0	0
Arkansas	3,075,053	22,067,600	2.0	24.0	69	141	2,526,990	5
California	40,600,275	5,463,835	3.6	21.0	1,471	5,235	93,829,040	4
Colorado	3,734,540	280,104,854	2.4	18.4	240	573	10,261,419	7
Florida	28,426	*	6.5	19.2	4	26	465,275	*
Illinois	9,000,000	180,000	1.0	18.2	609	586	10,498,847	0
Indiana	1,672,479	2,350,691	1.1	0.7	251	264	4,733,271	2
Kansas	15,316,817	155,826,509	2.4	24.6	754	1,778	31,875,326	2
Kentucky	2,178,114	101,362,982	0.3	17.5	224	72	1,289,708	6
Louisiana	11,779,256	50,402,837	2.0	15.9	146	293	5,244,523	6
Maryland	*	*	*	*	*	*	*	*
Michigan	3,089,050	88,228,804	3.7	6.0	58	212	3,800,293	2
Mississippi	1,094,205	10,690,535	3.0	23.8	2	6	107,459	6
Montana	2,085,300	34,123,251	2.2	18.2	47	102	1,819,516	1
Nebraska	1,644,062	2,522,377	3.1	5.3	27	83	1,481,782	5
Nevada	58,863	0	4.4	0.0	2	9	156,238	0
New Mexico	15,235,619	111,383,175	2.7	24.6	331	898	16,095,546	2
New York	397,060	12,041,408	0.3	18.2	105	33	594,771	1
North Dakota	2,406,132	1,234,700	4.4	15.8	12	52	939,564	3
Ohio	5,076,571	75,014,485	0.5	27.2	197	94	1,678,617	2
Oklahoma	23,799,316	329,693,635	1.9	25.9	2,385	4,445	79,668,402	1,
Pennsylvania	3,600,000	165,576,000	0.5	29.7	140	72	1,296,198	2
South Carolina	0	0	0.0	29.5	0	0	0	0
South Dakota	47,993	363,030	4.9	26.6	0	0	0	0
Texas	107,160,693	372,260,611	2.2	31.9	508	1,127	20,205,256	2
Utah	2,638,738	17,530,476	4.5	22.1	41	184	3,297,613	6
Virginia	1,402	2,611,817	1.3	9.7	0	0	0	0
West Virginia	679,134	109,832,150	0.5	22.1	0	0	0	*
Wyoming	4,196,568	58,696,937	2.8	0.0	0	0	0	0
Totals/Averages	**261,627,954**	**2,049,935,800**	**2.5**	**18.2**	**7,624**	**18,873**	**338,257,462**	**3,**

* Not Reported or Not Tracked Separately

Abandoned Gas Wells	Estimated Production	Estimated Value - Gas (MCF)	Oil and Gas
1	1,466	11,831	84,748
0	0	0	0
0	0	0	0
50	216,442	1,746,145	4,273,135
48	181,533	1,464,520	95,293,560
706	2,332,712	18,819,152	29,080,571
*	*	*	*
0	0	0	10,498,847
24	2,959	23,871	4,757,142
201	888,994	7,171,960	39,047,286
64	202,016	1,629,761	2,919,469
61	174,451	1,407,380	6,651,903
*	*	*	*
21	22,575	182,126	3,982,419
6	25,660	207,009	314,468
150	491,400	3,964,370	5,783,885
5	4,734	38,191	1,519,973
0	0	0	156,238
241	1,066,843	8,606,753	24,702,299
17	55,692	449,295	1,044,066
3	8,525	68,777	1,008,341
295	1,443,517	11,645,575	13,324,193
1,161	5,411,424	43,656,663	123,325,065
202	1,080,425	8,716,326	10,012,525
0	0	0	0
0	0	0	0
225	1,293,745	10,437,291	30,642,547
64	254,124	2,050,143	5,347,756
0	0	0	0
*	*	*	*
0	0	0	0
3,545	**15,159,236**	**122,297,139**	**460,554,601**

Another way of understanding the importance of marginal wells to the United States' economy is to examine the hypothetical scenario of abandoning all such wells. We show this in table 3[6]. The losses, both in terms of production volumes and revenue, are staggering, serving to underscore the importance of these wells. If all marginal oil wells were abandoned during 2008, this would have reduced domestic production by more than 260 million barrels of oil and would eliminate more than $26 billion in revenues. Likewise for natural gas, we see that production would be cut by 2.1 trillion cubic feet, which corresponds to a loss of $16 billion. The combined effect on lost state and national revenues of this hypothetical abandonment of marginal wells comes to $42.6 billion.

Even more striking than the direct revenue effects of abandonment are those imputed to other industries' output, earnings, and employment levels. Nationally, the effect on secondary suppliers and others if these stripper wells were abandoned result in more than $86 billion in lost earnings to companies and nearly $17 billion in lost wages to their employees, with potential lost employment numbering almost 400,000 jobs for those industries supporting the stripper well producers by acting as suppliers or local retailers selling to the firm's employees. In the oil and natural gas industry alone, actual abandonment of stripper wells could result in almost 110,000 job reductions with a resultant loss of workers' earnings (that could be spent on other goods and services locally or regionally) totaling $7.5 billion.

6 In Table 3, we show the largest hydrocarbon producing states, a subtotal from them and then all other states.

table 3 - economic impact of stripper production

OVERALL EFFECT IN FINAL DEMAND - STRIPPER OIL

State	Value of Stripper Oil Production Output	Final Demand Multipliers Earnings	Final Demand Multipliers Employment	Final Demand Multipliers Million $	Lost Output Million $	
California	4,043	1.99	0.43	9.52	8,041	
Colorado	372	2.06	0.43	8.64	767	
Kansas	1,525	1.95	0.38	14.11	2,969	
Louisiana	1,173	1.83	0.36	8.82	2,149	
Mississippi	109	1.60	0.30	9.32	175	
New Mexico	1,517	1.66	0.35	10.03	2,513	
North Dakota	240	1.74	0.35	10.99	418	
Oklahoma	2,370	2.04	0.42	11.47	4,834	
Texas	10,670	2.09	0.43	8.43	22,251	
Utah	263	1.89	0.40	11.58	498	
Wyoming	418	1.73	0.32	7.91	725	
SUBTOTAL	22,699	2.03	0.42	9.30	46,135	
ALL OTHERS*	3,352	2.03	0.42	9.30	6,813	
TOTAL	**26,051**				**52,948**	**11,0**
	26,051,000,000					

OVERALL EFFECT IN FINAL DEMAND - STRIPPER GAS

State	Value of Stripper Gas Production Millions $	Final Demand Multipliers Output	Final Demand Multipliers Earnings	Final Demand Multipliers Employment	Lost Output Million $	
California	44	1.99	0.43	9.52	88	
Colorado	2,260	2.06	0.43	8.64	4,661	
Kansas	1,257	1.95	0.38	14.11	2,447	
Louisiana	407	1.83	0.36	8.82	745	
Mississippi	86	1.60	0.30	9.32	138	
New Mexico	899	1.66	0.35	10.03	1,488	
North Dakota	10	1.74	0.35	10.99	17	
Oklahoma	2,660	2.04	0.42	11.47	5,426	
Texas	3,003	2.09	0.43	8.43	6,263	
Utah	141	1.89	0.40	11.58	268	
Wyoming	474	1.73	0.32	7.91	821	
SUBTOTAL	11,240	2.03	0.42	9.30	22,846	
ALL OTHERS*	5,298	2.03	0.42	9.30	10,767	
TOTAL	**16,538**				**33,613**	**7,01**

ECONOMIC IMPACT OF 2008's STRIPPER WELL ABANDONMENT - OIL & GAS COMBINED

NATIONAL IMPACT IN FINAL DEMAND

	2008 Revenue Lost From Abandonment Million $	Lost Output Million $	Lost Earnings Million $	Lost Emplоment	
SUBTOTALS	33,939	68,565	14,266	318,271	
ALL OTHERS*	8,650	17,409	3,671	80,441	
TOTAL	**42,588**	**86,561**	**17,902**	**398,718**	**7,49**

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

OIL & GAS INDUSTRY

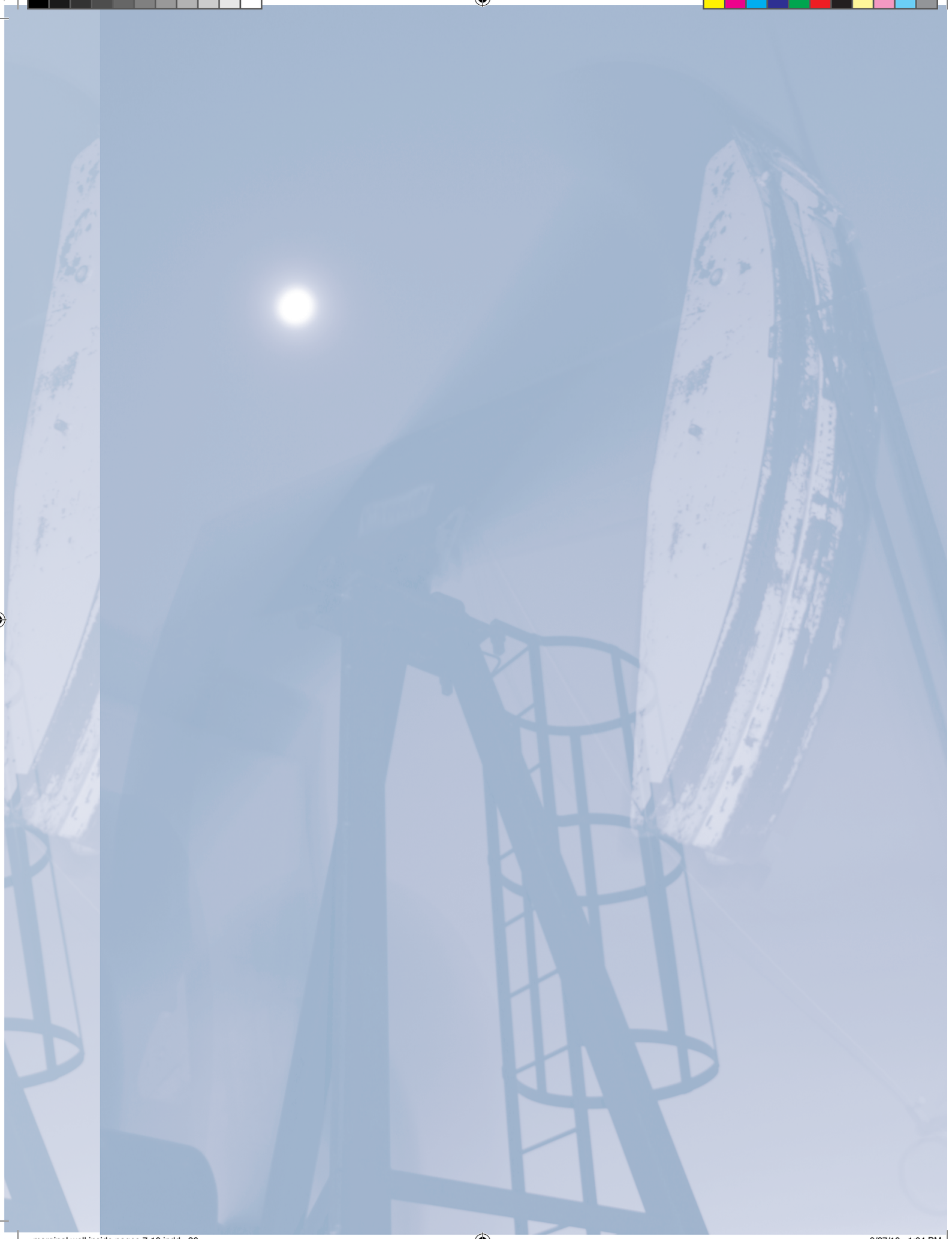
Lost Earnings	Lost Employment Earnings	Direct Effect Multipliers Employment	Direct Effect Multipliers Million $	Lost Earnings	Lost Employment
1,746	38,503	0.18	3.45	724	13,949
161	3,211	0.17	1.89	64	701
578	21,523	0.17	6.96	263	10,618
426	10,343	0.16	2.33	184	2,730
33	1,015	0.15	3.84	16	418
529	15,221	0.17	3.74	260	5,677
85	2,632	0.17	4.53	42	1,085
1,001	27,177	0.18	3.11	419	7,380
4,624	89,996	0.18	1.57	1,870	16,725
106	3,043	0.16	3.70	43	973
135	3,305	0.17	2.68	71	1,118
9,633	211,097	0.18	2.56	3,993	58,108
1,423	31,174	0.18	2.56	590	8,581
11,056	**242,271**			**4,582**	**66,690**

OIL & GAS INDUSTRY

Lost Earnings Million $	Lost Employment	Direct Effect Multipliers Earnings	Direct Effect Multipliers Employment	Lost Earnings Million $	Lost Employment
19	420	0.18	3.45	8	152
980	19,516	0.17	1.89	386	4,262
476	17,741	0.17	6.96	217	8,752
148	3,586	0.16	2.33	64	946
26	804	0.15	3.84	13	331
313	9,016	0.17	3.74	154	3,363
4	109	0.17	4.53	2	45
1,124	30,503	0.18	3.11	470	8,284
1,302	25,330	0.18	1.57	526	4,708
57	1,638	0.16	3.70	23	524
154	3,746	0.17	2.68	81	1,267
4,770	104,535	0.18	2.56	1,977	28,775
2,248	49,267	0.18	2.56	932	13,562
7,019	**153,802**			**2,909**	**42,337**

OIL & GAS INDUSTRY

Lost Earnings Million $	Lost Employment
5,938	87,425
1,508	22,393
7,491	**109,027**



conclusion

According to the Energy Information Administration, the United States consumed 7.1 billion barrels of crude oil during 2008. This report indicates that only 18 percent of U.S. consumption of oil is supplied by domestic wells. But of that domestic production, marginal oil wells represent 20 percent of the total – an important component of domestic energy policy. The EIA reports that consumption of natural gas in the U.S. during 2008 was slightly more than 23 trillion cubic feet (TCF). About 80 percent of that consumption is produced domestically. And domestic marginal gas wells supplied about 20 percent of our country's production of this clean fuel. Overall then, about 10 percent of America's consumption of natural gas comes from stripper wells.

Marginal well operations are not only important for energy policy purposes. We find that every $1 million directly generated by marginal production results in more than $2 million of activity elsewhere in the economy as non-industry companies benefit from the trickle down. And each additional $1 million of production from these wells employs almost 10 workers directly and indirectly, with some producers employing as many as 15 workers.

Operations related to stripper wells remain an important part of the domestic oil and natural gas industry. Local and regional jobs are provided, state tax revenues are enhanced, and the national economy is improved. And marginal wells remain an important part of domestic energy policy. Every barrel of domestically produced crude oil is a barrel that does not have to be bought internationally from uncertain suppliers.

While both crude oil and natural gas prices have been declining recently, most economists see that as temporary. As long as supplies remain tight relative to demand, prices inevitably will rise.

new energy technologies excerpt

marginal wells interstate oil and gas compact commission

excerpt from New Energy Technologies: Regulating Change, IOGCC 2010)

IOGCC defines a marginal (stripper) well as a well that produces 10 barrels of oil per day (BOPD) or 60 thousand cubic feet (Mcf) of natural gas per day or less. Generally, these wells started their productive life generating much greater volumes using natural pressure. Over time, the pressure decreases and production drops. That is not to say that the reservoirs that feed the wells are depleted. It has been estimated that in many cases a marginal well may be accessing a reservoir that still holds two-thirds of its initial potential value. However, this depends greatly on the reservoir properties.

Because these resources are not always easily or economically accessible, many of the marginal wells in the United States are at risk of being prematurely abandoned, leaving large quantities of oil or gas behind. Continued production of marginal wells supports the environmental concept of reduce, reuse, and recycle by maximizing use of one resource before moving on to another. The environmental impact of site construction and drilling activities already has occurred, so recovering the remaining reserves before moving on is the right choice.

Marginal well production is a significant factor in the domestic energy picture. Marginal wells are those that produce less than 10 barrels of oil per day or less than 60,000 cubic feet of gas per day. The Interstate Oil and Gas Compact Commission (IOGCC) has monitored production from these wells since the 1940s.I Individual wells contribute only a small amount of oil (about 2.5 barrels per day nationally in 2008) but there were more than 375,000 of these wells in the United States, about 5 percent fewer than in 2007. Combined, these marginal wells produced almost 262 million barrels of oil in 2008 – about 20 percent of U.S. production. Marginal gas wells numbered more than 322,000 in 2008 (about the same as the prior year) and produced about 2.1 trillion cubic feet of natural gas (a 23 percent increase over the previous year) – about 19 percent of total U.S. production.

In addition to supplying much-needed energy, marginal wells are important to communities across the country, providing jobs and driving economic activity. Every $1 million directly generated by marginal production results in more than $2 million of activity elsewhere in the economy. Additionally, the tax dollars paid in 2007 by marginal producers to states amounted to nearly $1.3 billion that can be reinvested in states to help communities thrive.

Several states have enacted individual incentive programs intended to promote production from these

marginal wells. But there is no broad agreement toward the necessity of these incentives. In the face of lower crude oil and natural gas prices, many of these wells might be abandoned, ending their contribution to domestic production levels and leaving reserves dormant.

It is important from a security standpoint that wells keep producing. From an economic standpoint, marginal wells need to keep producing based upon the number of jobs generated by operation, the impact of production on local and state economies, and the fact that much of the U.S. energy economy is dependent upon marginal well production.

Technology has become vitally important because it is the key to keeping operating costs down and to boosting production from marginal wells. State governments also have a role in ensuring the success and safety of a domestic energy infrastructure via state tax regimes. Congress is considering legislation to help keep the taxes on marginal well production low. These three forces are working together to keep "home wells flowing" and to promote a secure energy future for the United States.

marginal producers: independent, localized, making a national difference

Small, independent companies are the largest producers of marginal oil and gas and are the heart of the domestic oil and gas industry (Stripper Well Consortium, 2005). An Independent Petroleum Association of America (IPAA) survey conducted in 2009 found that stripper well production accounted for 80% of small independents' oil production and 67.5% of natural gas production; for mid-sized producers, 40% of oil production and 50% of natural gas production came from marginal wells. (Independent Petroleum Association of America, 2009).

In the fall of 2008, the economic crisis that began in late 2007 hit the oil and gas industry, and the price of oil fell to just above $48 per barrel. Unfortunately, marginal producers live and die by the margins. A "breakeven analysis" found that for marginal producers to match production costs, the price of oil and gas had to be at or above $44.73 per barrel of oil and $4.66 per uneconomical to produce, they are threatened with premature plugging and abandonment, leaving vast amounts of oil and gas trapped in the ground (Interstate Oil and Gas Compact Commission, 2008). At those prices, there were some marginal producers who survived and there were others who could not operate. (State of Oklahoma Commission on Marginally Producing Wells, 2009)

technology and marginal producers: the laboratories of production

Technology is the key to allowing marginal producers to boost production. Marginal producers typically do not have the budgets for research and development (Stripper Well Consortium, 2005), and federal funding for research and development has been reduced. (Interstate Oil and Gas Compact Commission, 2008) A key stakeholder and facilitator in the development of marginal recovery technology is the Stripper Well Consortium that was founded in 2000 to facilitate the transfer, development, demonstration, and deploy-

ment of new technologies needed to increase recovery and lower production costs. (Stripper Well Consortium, 2005) The SWC does this through the pooling of financial resources and co-funding projects with the DOE through the National Energy Technologies Laboratory, New York State Energy Research and Development Authority (NYSERDA) and Penn State University. (Stripper Well Consortium, 2005)

The SWC works in four broad areas: reservoir remediation; wellbore liquids removal and cleanup; surface system optimization; and environmental work. (Interstate Oil and Gas Compact Commission, 2008) Since its establishment, the SWC has helped to fund more than 95 projects aimed at helping marginal producers. (Interstate Oil and Gas Compact Commission, 2008)

One of the biggest and most costly problems that marginal producers face is how to deal with produced water. Produced water accumulates in flow-lines or builds up at the bottom of the well, dramatically reducing the flow rates of oil and gas. In 2002, the SWC funded a project in conjunction with Vortex Flow, LLC to help solve this water transportation issue. (Stripper Well Consortium, 2005) The project resulted in the development of the Vortex Flow SX Unit for flow-lines. The tool allows for the reorganization of streams to allow for the separation of gas and liquid. The liquids move along the outside of the pipe while the gas moves along the inside. (Stripper Well Consortium, 2005) This reduces the drop in pressure between gathering points in the pipeline system. (Stripper Well Consortium, 2003) In January of 2008, the Rocky Mountain Oilfield Testing Center reported that Vortex Flow had contacted the center to conduct testing of its units in high flow rate gathering systems. (Milliken, Mark; Rocky Moutain Oilfied Testing Center, 2008) It was shown that the Vortex Flow Units will help increase flow rates. (Milliken, Mark; Rocky Moutain Oilfied Testing Center, 2008)

In addition to the Vortex Flow SX Unit, the SWC, in conjunction with NYSERDA, BEDCO, and NETL, combined funding for the development of a tool that utilizes the natural pressure in the wellbore to lift the water out of the well on a regular basis. (Stripper Well Consortium, 2005) This tool, called the "Gas-Operated Automatic Lift." allows for the automatic lifting of saltwater out of the wellbore with the subsequent improvement of natural gas production. (Stripper Well Consortium, 2005) Initial testing showed an increase in gas production from 1100Mcf/year to an estimated 3416Mcf/year with payout expected in less than a year. (Stripper Well Consortium, 2005) At the conclusion of field tests, NETL concluded that "the need for and applicability of a Gas Operated Automatic Lift Petro-Pump for removal of fluids from a significant portion of stripper wells…has been proven by this field-applied research for the oil and gas wells of America and the world." (Stripper Well Consortium, 2005) In addition to the tests and data compiled by the developers of the tool, NETL also found that gas production was increased in stripper wells that used the tool. For the majority of sites where the tool was tested, the wells saw an increase in production between 60% and 300%. (Stripper Well Consortium, 2005)

Another problem associated with water infiltration that can restrict the economics of marginal production is the disposal of produced saltwater. Historically, produced water has been viewed by most as a waste stream that must be disposed of. (Stripper Well Con-

sortium, 2005) That viewpoint has changed, leading some to the belief that produced water is not a waste, but has marketable benefits. (Stripper Well Consortium, 2005) To help deal with the problem, Texas A&M developed a trailer that allows for the treatment of produced saltwater. The trailer essentially acts as a water-recycling facility with the end product being marketable fresh water. (Stripper Well Consortium, 2005) In conjunction with Texas A&M, SWC worked on studying the environmental and regulatory issues relating to the use of produced water. Texas A&M developed guidelines for companies to follow for making this new source of fresh water available for productive use. The guidelines have resulted in the development of technology accepted by the Railroad Commission of Texas, the Texas Water Development Board, and the Texas Committee on Ground Water Resources for the treatment of produced water. (Stripper Well Consortium, 2005)

technology and environmental protection

The goal of the IOGCC is the fulfillment of its core values --- conservation and the efficient recovery of natural resources. Paramount in that mission is the concept of reducing, reusing, and recycling, which are the goals of conservation and conscientious development. The IOGCC and various state and federal regulatory authorities share a common goal: the protection of the environment. As the focus of the oil and gas industry shifts toward conservation and environmental protection and the regulatory environment becomes more attuned to the needs of our shared, fragile environment, technology will play a key role in the facilitation of safe and effective operations, keeping operators always mindful of their bottom line but more importantly of their impact on the environment.

With that in mind, regulators continue to take a balanced approach in the regulation of oil and gas operations. The goal of regulators and the oil and gas industry is the protection of our collective health, safety, and environment. Regulators and operators understand that fundamentally they work together although they are seemingly at odds with each other. Working in tandem, regulators and the industry have developed a symbiotic relationship, with each sector encouraging the other to perform its role a little better with each passing year. Industry can better itself by rising to the challenges of needed regulations through the effective development and use of technology to protect operations and, more importantly, the environment.

The “gusher,” once a sign of drilling success, is now a thing of the past. With rising prices and mounting concern over the environment, operators are now taking appropriate measures to mitigate their environmental impact and to boost production. Changing focus has not been cheap, though. The cost of environmental compliance has risen steadily and it is now estimated that the U.S. oil and gas industry spends $9 billion on environmental compliance, with that number likely to increase. (U.S. Department of Energy Office of Fossil Energy)

Rising regulatory costs are a concern for the industry as a whole but are of special significance to marginal producers that typically are small and do not have the capital or wherewithal to handle rising costs as effectively as the large operators. To help mitigate the

costs of environmental compliance, technology is key. To facilitate development of technology, to reduce environmental impacts and to boost overall recovery in an environmentally sound fashion, industry and government have come together to address the issues associated with environmentally sound development of oil and gas resources. Technological advances resulting from the collaboration of industry and government are making exploration, production, and processing cheaper and more protective of the environment. An example of the collaboration is the development of the "LINGO" system by the DOE's Office of Fossil Energy. The Low-Impact Natural Gas and Oil initiative integrates current technologies and practices in ways that minimize the adverse environmental effects of oil and gas production. The goal of LINGO is to show that low-impact oil and gas technologies can be developed and deployed in environmentally sensitive areas. (U.S. Department of Energy Office of Fossil Energy)

Another project sponsored by the DOE that addresses environmental concerns associated with the production of oil and gas is the "stranded gas" project. Stranded gas is natural gas that is uneconomical to produce. Typically, there are three ways to deal with stranded gas: the gas can be vented or flared; it can be re-injected; or the well can be shut in. The options are not desirable, either coming at a cost to the environment (venting into the atmosphere) or to the operator (re-injection costs or shutting in the well) or to the public (venting into the atmosphere and leaving needed hydrocarbons in the ground). The project is called Oil Field Flare Gas Electricity Systems (OFFGASES) and it is turning waste gases into a valuable fuel for power generation at marginal well sites in California. Oil production sites use a lot of electricity and in some cases electrical costs can be onerous enough to make the well too expensive to operate, especially for marginal producers. The DOE estimates that electricity consumption can account for as much as 40% to 60% of the operating costs of wells. The OFFGASES project uses microturbines to employ the stranded gas to generate electricity to be utilized at the well site, usually costing 20% to 40% less than the electricity pulled from the grid. The project is increasing production in fields that were all but forgotten. (U.S. Department of Energy National Energy Technology Laboratory, 2007)

Air quality issues affect marginal producers as well. Generally speaking, the oil and gas industry emits significantly less pollution than many other industries. Because of the oil and gas industry's historically low emissions, state and federal regulatory agencies typically have focused their efforts on the large sources of air pollution. However, as those larger point sources have been brought into regulatory compliance, regulators have focused on aggregate air pollution from smaller, movable sources, including the oil and gas industry. Most small operators don't have designated departments to deal with environmental regulatory compliance. To these small producers, air pollution regulations and permitting requirements can seem complex. To help operators navigate the complexities of air pollution regulation, the EPA has established a low-tech, yet effective, method of helping underfunded producers. They are called Compliance Assistance Centers, which help various industries understand their environmental obligations. (Interstate Oil and Gas Compact Commission, 2009) Compliance Assistance Centers provide advisers to assist regulated businesses in bringing their operations into regulatory compliance through one-on-one contact, usually in

the form of workshops and demonstrations. To help in planning for compliance, the EPA also has made available a financial planning tool that helps communities and industry plan for the costs associated with compliance. (U.S. Environmental Protection Agency, 2009)

federal tax incentives

The federal government addressed tax incentives for marginal well production in 1998. H.R. 3688 amended the Internal Revenue Service Code of 1986 by providing a tax credit for marginal oil and natural gas well production. The current federal tax credit for marginal oil and gas wells is $3 per barrel of qualified crude oil production and 50 cents per 1,000 cubic feet of qualified natural gas production. The bill provides for a reduction in the tax credit as market prices increase, calls for an adjustment in the credit amount to account for inflation, and sets a limitation on the amount that can be produced from a marginal well at 1,095 barrels or "barrel equivalents." Barrel equivalent is defined as a conversion ratio of 6,000 cubic feet of natural gas to one barrel of crude oil. (H.R. 3688, 105th Congress)

The fate of federal incentives is uncertain, though. The first session of the 111th Congress saw the introduction of legislation to terminate the marginal well tax incentives. (S. 888, 111th Congress; see also S. 1087, 111th Congress) In addition to the proposed legislation, on February 26, 2009, President Obama unveiled his $3.6 trillion budget for the upcoming fiscal year. The administration's proposed budget calls for the elimination of "oil and gas preferences" estimated to be worth more than $31.48 billion over 10 years in addition to raising other taxes on the oil and gas industry. (Divisions form over oil, gas provisions in Obama budget, 2009) It is hoped that by removing the federal tax incentive for oil and gas production the current level of "excessive" investment in oil and gas operations would be curtailed, carbon emissions would be reduced, production of renewable fuels would be increased, and tax subsidies would be redirected from the oil and gas sector to "more productive uses." (Energy Policy Research Foundation, Inc., 2009)

The proposed budget has drawn criticism not only from professionals in the oil and gas industry but from ranking members of Congress and various executive officials on the state level. One senator characterized the proposed budget as an "attempt to drive the oil industry overseas through a combination of breaching past agreements the government has made with oil and gas producers and making future production more difficult and expensive." (Divisions form over oil, gas provisions in Obama budget, 2009) Another senator stated the proposed budget was "an honest and balanced blueprint for America's future" but expressed concern on what the budget could mean for the domestic oil and gas industry, stating, "in these tough times we do not need to disadvantage our domestic energy industry, which is critical to the nation's security, against foreign competitors." Another senator added his concern, stating: "In the United State, there are nearly 6 million Americans directly and indirectly employed as a result of the oil and gas industry. Tax increases of this magnitude will significantly curtail the operating budgets of all exploration and production companies, big and small. Every marginal well operator in the country should be gravely concerned that these proposals will force

the premature plugging of low-production marginal wells." Highlighting the importance of hydrocarbon production in bridging the gap between a hydrocarbon present and a "green future," David Holt, president of Consumer's Energy Alliance, said, "The realization of an alternative energy future will not be achieved by making a reliable energy present impossible." My fear is that a number of the provisions in this budget would do precisely that at precisely the wrong time for struggling consumers and a flagging economy." (Divisions form over oil, gas provisions in Obama budget, 2009)

In addition to the concerns expressed by those in Congress and the industry, state officials also have voiced their concerns over the President's proposed budget. In a letter dated April 16, 2009, addressed directly to President Obama, the commissioners of the Oklahoma Corporation Commission stated that the energy taxes in the proposed budget would have a disastrous effect on the Oklahoma economy, having dire consequences for the state's education budget, the state's environmental clean-up efforts, and its job creation programs. The letter lays out the effects that the proposed budget would have on the industry within the state. Oil and natural gas production provides 10% of state-apportioned dollars for education in Oklahoma, and funding for environmental clean-up of abandoned well sites and land remediation is pegged directly to revenues from oil and natural gas production. Approximately 16% of Oklahoma's gross state product comes from the oil and gas industry, with much of the production coming from stripper wells. The repeal of the intangible drilling costs, the percentage depletion allowance, the marginal well tax credit, and the EOR tax credits would have serious consequences for the state of Oklahoma's budget. (State of Oklahoma, Oklahoma Corporation Commission, 2009) When asked about the President's proposed budget, Corporation Commission Chairman Bob Anthony stated:

"The administration's defense of its approach is that this strategy is necessary to decrease our dependence on foreign oil. The tragedy is that this will, in fact, increase our dependence by driving America's domestic producers out of business."

Commissioner Jeff Cloud drew comparisons to the Carter administration's windfall profits tax on energy producers, citing that much of the rhetoric from the Carter administration is mirrored by the Obama administration with both stating the extra revenue from the increased taxation could be used to fund alternative energy and reduce our dependence on foreign oil. Commissioner Cloud points out that under the Carter administration's plan, U.S. "dependence on foreign sources grew by thirteen percent and tax revenue from the industry decreased because domestic drilling budgets were slashed in order to meet the extra tax burden." Commissioner Dana Murphy acknowledged the need to keep developing alternative energy resources but noted "we also have a very real need for oil and natural gas. Our domestic supplies are critical to meeting that need." (Hunt, 2009)

Other states have voiced concern similar to the Oklahoma Corporation Commission. Bill Sydow, a member of the Nebraska Oil and Gas Compact Commission, stated that the commission does not view the current depletion allowance and intangible drilling costs as "incentives" but necessities for a healthy oil and gas industry in the United States. Sydow expressed concern that "if these allowances are taken away…drilling activity in Nebraska would virtually

cease." Herschel McDivitt, of the Indiana Department of Natural Resources, stated: "Any tax incentives that would substantially increase tax liabilities or significantly reduce existing tax incentives for independent oil and gas producers would have a drastic negative effect on Indiana's oil and gas industry." Brandon Nuttall, of the Kentucky Geological Survey, said that "getting rid of windfall profits, depletion allowances, and others [tax incentives] might look good when touting billion dollar profits for giant international firms, but these incentives can keep small operators in business." (Interstate Oil & Gas Compact Commission, 2008)

The purpose of increased taxes is to increase state and federal revenue. Increased tax revenues from the removal of upstream production incentives will be offset through the loss of domestic production and exploration. Particularly important to marginal producers is the threatened repeal of the percentage depletion tax credit. For marginal producers, cash flow is crucial in keeping high-cost operations running. The percentage depletion tax incentive entitles marginal producers to a tax deduction based upon the well's gross income. This incentive helps with marginal producers' cash flow, allowing them to reinvest in the maintenance of their wells and the expansion of their operations. (Energy Policy Research Foundation, Inc., 2009)

approach of the states

With the increase in energy prices that began in the late 1990s and ended dramatically in the fall of 2008, there was basic economic incentive for operators to produce marginal wells – the profits from marginal well production easily outweighed the cost of production. Now with depressed energy prices, the basic economic incentive is no longer present. Consequently, investment in marginal wells has slowed dramatically and in some cases, has ceased, leaving the majority of oil or gas trapped in the reservoir. In an effort to shore up production from marginal wells and to encourage continued investment in marginal well production, many states have taken to offering production incentives for marginal wells by utilizing tax credits. The general purpose of the tax reductions is to make production cheaper, usually by calling for a percentage reduction in the taxes paid on production from the marginal wells.

To support marginal well production in Alaska, the Legislature has approved a reduction on royalty payments. This law gives the Commissioner of Natural Resources the right to determine royalty rates for uneconomical oil and natural gas resources. (Alaska Stat. § 38.05.180 (2009)) The goal of this law is to bring known marginal resources into production and temporarily extend the life of production that is about to be abandoned.

Louisiana has taken steps to ensure production from marginal gas wells by enacting a law that allows wells that produce less than 250 mcf/day to be taxed at a reduced rate of $.013/mcf. (Louisiana Rev. Stat. Ann. § 47:633(c)(2009))

Oklahoma has taken measures to make sure marginal wells keep producing. The Legislature established the Oklahoma Commission on Marginal Wells, which collects and distributes information on stripper production and performs many other activities and functions that are vital to stripper well production. The state also has taken steps to protect economically

at-risk oil leases. Operators of at-risk leases can apply to the Oklahoma Tax Commission for a rebate of 6/7ths of the gross production tax upon demonstrating that they operate a lease that is economically at-risk. (Oklahoma Stat. tit. 68, § 1001.3a (2005))

The Railroad Commission of Texas has the authority to exempt marginal gas wells from otherwise applicable production limitations so long as the wells are located in fields without special field rules. (Texas Nat. Res. Code Ann. § 86.091 (2009)) The purpose of this authority is to relieve the regulatory burden of testing marginal gas wells. This raises the production limitations on wells and reduces industry expense associated with the testing of gas wells.

In addition to the exemption for marginal gas wells, the Texas School Land Board may grant reduced royalty payments for a period of two years for marginally economical state leases. If at the end of two years, the well is still marginally economical, the operator may reapply for another two-year period of royalty reduction. (Texas Nat. Res. Code Ann. § 86.091 (2009)) The statute is designed to extend the lives of leases on state land to keep royalty payments coming into the state and to keep the wells from being shut-in and abandoned.

Texas also allows for tax credits on low-producing wells to make low-producing wells economical to boost the recovery of the state's mineral resources. The Texas Tax Code provides three levels of taxation based upon the market price for oil or gas. (Texas Tax Code Ann. § 201.058 (2009))

The spike in oil and gas pricing after mid-year 2008 and the subsequent crash by years-end has caused concern regarding how many wells will be shut-in as uneconomical. Wyoming has seen an increase in shut-in or idle wells specifically within the first 6 months of 2009. In addition, low natural gas prices may force viable companies into bankruptcy, increasing the number of orphaned wells that would need to be plugged, abandoned, and reclaimed by the Wyoming Oil and Gas Commission, thereby putting the burden of remediation on the state.

"So we have a choice to make. We can remain one of the world's leading importers of foreign oil, or we can make the investments that would allow us to become the world's leading exporter of renewable energy. We can let climate change continue to go unchecked, or we can help stop it. We can let the jobs of tomorrow be created abroad, or we can create those jobs right here in America and lay the foundation for lasting prosperity." – President Barack Obama, March 19, 2009

While there is no cure for U.S. dependence upon foreign sources to meet domestic energy demands, steps can be taken to help ensure U.S. energy security. One of the first, and most important, steps is ensuring the safety and vitality of the United States' marginal wells. Technology is key to ensuring their economic vitality. In addition to technology, the tax incentives currently in place help to encourage domestic production and reduce our dependence upon foreign oil. By taking away tax incentives, the U.S. would "remain one the world's leading importers of foreign oil." (Obama, 2009)

The road to a "green future" goes through a "carbon present." By discouraging domestic production, the likelihood of a successful "green" transition is severely diminished. Oil and gas are needed to supply the United States economy and to drive the United States to a sustainable future.

Marginal Well Case Study: Texas Supports Its Small and Independent Producers

The Railroad Commission of Texas (RRC) does not use the terms "small and independent producers." However, based on the statistics for marginal wells, Texas has 46,234 domestic marginal gas wells out of a total of 95,814 and 132,297 stripper oil wells out of 155,822. Because of the preponderance of marginal wells, RRC estimates the significant majority of Texas producers could be considered "small".

For purposes of tax incentives, Section 201.059 of the Texas Tax Code defines "Qualifying low-producing wells" as gas wells whose production during a 3-month period is no more than 90 mcf per day, excluding gas flared pursuant to the commission's rules.

Under 16 TAC 3.79(15), Texas defines "marginal well" as any oil well which is incapable of producing its maximum capacity of oil except by pumping, gas lift, or other means of artificial lift, and which well so equipped is capable, under normal unrestricted operating conditions, of producing such daily quantities of oil as herein set out, as would be damaged, or result in a loss of production ultimately recoverable, or cause the premature abandonment of same, if its maximum daily production were artificially curtailed. Wells meeting the following descriptions are "marginal":(A) Any oil well incapable of producing its maximum daily capacity of oil except by pumping, gas lift, or other means of artificial lift, within this state and having a maximum daily capacity for production of 10 barrels or less, averaged over the preceding 10 consecutive days of stabilized production, producing from a depth of 2,000 feet or less.

(B) Any oil well incapable of producing its maximum daily capacity of oil except by pumping, gas lift, or other means of artificial lift, within this state and having a maximum daily capacity for production of 20 barrels or less, averaged over the preceding 10 consecutive days of stabilized production, producing from a horizon deeper than 2,000 feet and less in depth than 4,000 feet.

(C) Any oil well incapable of producing its maximum daily capacity of oil except by pumping, gas lift, or other means of artificial lift, within this state and having a maximum daily capacity for production of 25 barrels or less, averaged over the preceding 10 consecutive days of stabilized production, producing from a horizon deeper than 4,000 feet and less in depth than 6,000 feet.

(D) Any oil well incapable of producing its maximum daily capacity of oil except by pumping, gas lift, or other means of artificial lift, within this state and having a maximum daily capacity for production of 30 barrels or less, averaged over the preceding 10 consecutive days of stabilized production, producing from a horizon deeper than 6,000 feet and less in depth than 8,000 feet.

(E) Any oil well incapable of producing its maximum daily capacity of oil except by pumping, gas lift, or other means of artificial lift, within this state and having a maximum daily capacity for production of 35 barrels or less, averaged over the preceding 10

consecutive days of stabilized production, producing from a horizon deeper than 8,000 feet. (Reference Order Number 20-59,200, effective May 1, 1969.)

In Texas, most wells are drilled and produced by small, independent companies. The White House has proposed elimination of more than $26 billion in tax breaks for oil and gas--half of that coming from eliminating a tax break for domestic oil and gas production. These incentives generally are for operators to pursue reserves. There are not as many incentives to increase or sustain production. Any change in existing incentives generally disproportionately impacts the small and independent operators more than the larger companies.

Crude oil and other petroleum products have been a major component of the Texas economy, in recent decades accounting for 10% to 25% of the Gross State Product. The combined oil and natural gas industry in 2006 employed 3.1% of the state's workforce and paid that workforce $30.6 billion - 6.9% of all wages. (Texas Comptroller of Public Accounts, internal data with supplementary data from U.S. Bureau of Economic Analysis.)

Oil and natural gas production in Texas, although not as great as in the past, remains an important source of economic benefit, in terms of value, jobs created, and taxes. Historically, the oil and natural gas industry has accounted for approximately 10% to 25% of the state's GSP, a trend that roughly tracks the price of oil. In 2007, oil accounted for 15.7% of the GSP. According to the Texas Comptroller's input-output model of Texas' economy, the total economic value of oil and gas is 2.91 times the value of production. Additionally, 19.1 jobs are created per $1 million of oil and gas production. Assuming oil and natural gas prices of $25/bbl and $5/Mcf, and year 2002 annual production of 366 MMbbl and 5.7 Tcf, wellhead value exceeds $37 billion. Annual natural gas value is currently 3.1 times that of the oil wellhead value to Texas. In terms of economic value trickled down through the Texas economy and jobs created, this figure equates to nearly $110 billion and 719,115 jobs. Severance, ad valorem, and indirect taxes provide additional economic benefits of more than $6 billion to Texas. The leasing of mineral rights to state- and university-owned lands statewide, moreover, provides royalty and leasing revenue that replenishes the Permanent University and School Funds, important sources of revenue for public education in Texas.

In 2006, more than 312,000 Texans, or 3.1% of the state's work force, were employed in the oil and natural gas industry, which accounted for $159.3 billion, or 14.9%, of Texas' GSP. For comparison, in 2003, the industry contributed $85.6 billion to GSP, 10.3% of the state GSP. The Barnett Shale Trend, which has an estimated potential of at least 26 Tcf, resulted in creation of more than 100,000 jobs and more than $10 billion annual output. (The Perryman Group, 2008)

According to the Texas Energy Plan 2005, (Texas Energy Planning Council, December 2004), a modest increase in exploratory drilling in Texas of 20% for a single year could generate new revenues to the state of $60 million and these estimates are based on an assumed oil price of $32.50 per barrel. The estimated net tax revenue effect at various percent increases in exploratory drilling is:

Percent Increase in Exploratory Drilling	10%	20%	30%
Net Annual Tax Revenue to State (millions)	$9.0	$37.5	$66.1

The federal and Texas governments impose several major taxes on oil and gas production and consumption, in addition to receiving royalties, rentals, and bonuses from the leasing of federal- or state-owned mineral ownership. The federal and state gasoline taxes support transportation initiatives such as highway infrastructure and mass transit.

Texas imposes severance taxes on the value of oil and gas produced in the state, which has been a major and relatively stable source of revenue until the last two decades. State government received increased tax revenues from the petroleum industry during the boom. In 1983, 28% of all tax revenue came from oil and gas operations. With the inclusion of federal payments, income from oil and gas taxes, mineral lease and bonus, and oil and gas royalties still comprised 17.16% of the revenues of state government. Severance, ad valorem, and indirect taxes provide additional economic benefits of more than $6 billion to Texas. Annual total marginal oil production tax revenue in 2006 was $444,124,979 and annual total marginal gas production tax revenue was $160,024,732. For purposes of tax incentives, Section 201.059 of the Texas Tax Code defines “qualifying low-producing well” as a gas well whose production during a 3-month period is no more than 90 mcf per day, excluding gas flared pursuant to the commission’s rules.

Enhanced Efficiency Equipment: Texas Tax Code, Section 202.061, provides for a severance tax credit for enhanced efficiency equipment installed on marginal oil wells between September 1, 2005, and September 1, 2009. "Enhanced efficiency equipment" means equipment used in the production of oil that reduces the energy used to produce a barrel of fluid by 10% or more when compared to commonly available alternative equipment. The term does not include a motor or downhole pump. Equipment does not qualify as enhanced efficiency equipment unless a Texas institution of higher education approved by the comptroller and that has an accredited petroleum engineering program has evaluated the equipment and determined that the equipment does produce the required energy reduction.

Two-year Inactive Well Exemption: The program, extended by the Legislature in September 1999, remains a valuable opportunity for operators of inactive wells to return the wells to production with a 10-year severance tax exemption on crude oil, casinghead gas, and well gas produced by the reactivated wells. The filing deadline for this severance tax incentive program was extended to August 31, 2009. The Railroad Commission can certify wells for the program through February 28, 2010. Any gas well or oil well with no more than one month of production in the two-year period prior to application to the commission for certification can be eligible. The commission designates monthly oil and gas wells that meet the above criteria. Operators are notified by letter of their initial eligibility for the exemption. Eligible wells are also identified on the Oil and Gas Schedule listed by operator with a single asterisk. As of November 13, 2000, more than 95,000 wells had been designated. If a designated well was returned to production prior to August 31, 2009, and the operator files a W-10/G-10 retest or a W-2 retest, the commission will send a letter to the operator. By signing the bottom of that letter and returning it to the commission, an operator is applying for certification in the program. Upon approval, a certification letter will be issued to the operator. This certification, along with Comptroller Form AP-158, is then filed with the Comptroller of Public Accounts to receive the tax exemption. Certified wells

are identified on the schedule with double asterisks.

Three-year Inactive Well Exemption: Although the commission issued its last certifications under this incentive February 29, 1996, (the statutory deadline), wells that were certified qualify for a severance tax exemption on oil, gas well gas, and casinghead gas produced in the 10-year period following certification. Certified wells are identified on the monthly stripout of allowables sent to oil and gas operators.

The Incremental Production Incentive. Leases with wells that averaged seven BOE (barrels of oil equivalent) a day or less in 1996 are eligible for a 50% tax reduction on incremental production. The period from September 1, 1997, through December 31, 1998, will be used to determine any increase in production over the 1996 baseline level. The exemption is granted as long as the price of oil, as judged by the comptroller, remains below $25 (adjusted to 1997 dollars). It is suspended if the price reaches $25 or above for three consecutive months and reinstated when it is below $25 for three consecutive months.

The Incentive to Market Previously Flared or Vented Casinghead Gas. If an operator markets casinghead gas that had previously been released into the air (vented or flared) for 12 months or more in compliance with commission rules and regulations, the operator may receive a severance tax exemption on that gas for the life of the well. Operators will apply to the Railroad Commission for certification.

Exemption for Gas from Reactivated Orphaned Wells. An exemption is allowed for gas and casinghead gas from a well certified as an "orphaned well" by the Texas Railroad Commission. An orphaned well is defined in Section 89.047(a)(3) of the Natural Resources Code as one that has a commission permit, has not reported production for the preceding 12 months, and whose current operator's commission-approved organization report has lapsed. When a certified orphaned well is put back into production by a certified operator, the well will be eligible for a 100% exemption from natural gas production tax and the oilfield cleanup fee for as long as the certified operator operates the well.

The Enhanced Oil Recovery (EOR) Incentive. Oil produced from an approved new EOR project or expansion of an existing project is eligible for a special EOR tax rate of 2.3% of the market value (one-half of the standard rate) for 10 years after commission certification of production response. For the expansion of an existing project the reduced rate is applied to the incremental increase in production after response certification.

The High-Cost Gas Incentive. Gas from wells defined as high-cost gas wells under Section 107 of the old Federal Natural Gas Policy Act (NGPA) is eligible for a severance tax reduction under this incentive. The level of reduction is based upon drilling and completion costs (this part is administered by the Office of Comptroller of Public Accounts). To qualify for the reduction the well must have been spudded or completed from September 1, 1996, through August 31, 2002. An earlier program granted a tax exemption if the well was spudded or completed between May 24, 1989, and September 1, 1996. The commission provides certification that the well is a high-cost gas well; that is, it produces gas from (a) a gas well completion below 15,000 feet deep, (b) a designated tight formation, (c) Devonian shale, (d) coal seams, or (e) geo-pressured brine.

(IOGCC Survey, 2009)

Recommendation: Support Production from Marginal and Stripper Wells

Excerpt from New Energy Technologies: Regulating Change (IOGCC 2010)

Oil production from marginal wells in 2008 accounted for almost 20% of domestic production, or more than 262 million barrels; 2008 natural gas production from marginal wells accounted for approximately 19% of total us production, or 2.1 trillion cubic feet of gas. To shore up production from these marginal wells and to encourage continued investment in marginal well production, many states have adopted incentives to production from these wells. Because marginal production accounts for such a large portion of overall domestic production, and that these low volume wells represent the ultimate in conservation, it is essential to the energy security of the United States.

In fact, the United States is the only country that produces a significant percentage of its oil and natural gas from marginally economic wells.

FEDERAL STAKEHOLDERS

- Work with the IOGCC and interagency in a coordinated effort to develop programs that address the opportunities and obstacles presented by marginal and stripper wells. Continue to support research and development activities through the Department of Energy and the National Energy Technology Laboratory targeting marginal/stripper wells. Federally supported research is critical in this niche area of petroleum production. A large percentage of the producers who own marginal wells are small companies. These producers operate on razor-thin margins that do not permit the "luxury" of research and development. As a result, some of the most important technologies that apply to marginal wells have been sponsored by the federal government and transferred to the marginal-well-owner community by targeted information deployment.
- While developing federal regulations that cut across the industry, weigh the importance of marginal wells to the country's economic development and energy security. Subjecting low-volume wells to the same regulations as larger producing properties serves as a disincentive to continued production and adds unnecessary costs to those who can least afford it. Production thresholds should remain as a regulatory option that permits a special class of well. This thinking during regulatory development could result in reduced paperwork requirements, less frequent reporting deadlines and eliminating the need for reporting very small quantities of work place necessities, such as solvents, chemicals and solid waste and even human resource reporting requirements.
- Seek and support cost-effective incentives that produce tax or economic benefits in excess of the cost of the incentives themselves. There are many examples of well-designed incentives that sacrifice short-term tax revenue for the long-term contribution that results from on-going commercial activity.
- Fund outreach activities for marginal well owners. Specific program recommendations include funding the development and deployment of training on a variety of topics such as resource

conservation, pollution minimization and prevention, best practices for managing storm water runoff, surface spill mitigation and remediation training and awareness building relating to naturally occurring radioactive materials where higher risk exposure exists.

- Fund efforts to document national contributions by marginal wells to the country's economic development and energy security. This recommendation could be accomplished through an annual report on the volume of marginal production and its predicted contribution to the economy. This report should be widely circulated and serve as an example of responsible conservation practices, environmental protection and successful small businesses.
- Fund an annual survey of incentives employed by oil and gas producing states and the provinces of Canada. A clearinghouse of cost-effective incentive programs would be helpful to avoid the wasteful exercise of "reinventing the wheel."

STATE STAKEHOLDERS

- Continue state incentives and regulatory programs that support marginal and stripper well production and work with marginal well owners to identify other cost-effective options for regulatory streamlining.
- Maintain regulatory flexibility that permits innovative operating practices that protect the environment and prolong production.
- Serve as an advocate for marginal wells and their economic contribution to the state and local economies and their collective importance to the national energy picture. Potential target audiences for advocacy include local officials, federal officials and the general public.
- Continue public outreach operations specifically targeting producers who own and operate low volume wells, many of whom do not have the wherewithal or access to the changing regulatory environment.

INDUSTRY

- Continue developing and transferring technology that allows for the recovery of oil and gas from marginal/stripper wells.

CIVIC AND COMMUNITY GROUPS

- Because the impact of marginal well production has the greatest impact on the local level, community stakeholders have a vested interest in marginal/stripper wells. Civic and community groups are in a unique position to keep the public's attention on the importance of marginal oil and gas production.

Marginal Wells Incentives

IOGCC MEMBER/ASSOCIATE MEMBER STATES WITH MARGINAL WELL INCENTIVES

Alabama	Y	Nevada	
Alaska	Y	New Mexico	Y
Arizona		New York	
Arkansas	Y	North Carolina	
California		North Dakota	Y
Colorado	Y	Ohio	
Florida	Y	Oklahoma	Y
Georgia		Oregon	
Idaho		Pennsylvania	
Illinois		South Carolina	
Indiana		South Dakota	
Kansas	Y	Tennessee	
Kentucky		Texas	Y
Louisiana	Y	Utah	Y
Maryland		Virginia	
Michigan	Y	Washington	
Mississippi		West Virginia	Y
Missouri		Wyoming	Y
Montana	Y		
Nebraska	Y	**COUNT**	**17**

State	Alabama
Category	Tax incentive
Citation	Ala. Code § 40-20-2(a)(3) (1975)
Title	*Levy and Amount of Tax Upon Business of Producing or Severing Oil or Gas from Soil, etc., Generally.*
Discussion	Reduces the privilege tax to 4% of value on wells producing 25 barrels of oil or less per day, or 200 Mcf per day of natural gas.
URL	http://alisondb.legislature.state.al.us/acas/codeofalabama/1975/40-20-2.htm

State	Alaska
Category	Tax incentive
Citation	Alaska Stat. § 38.05.180(f)(6)
Title	*Oil and Gas and Gas Only Leasing*
Discussion	The statute reduces royalty for oil from platforms in the Cook Inlet Basin that produce less than 1,200 bpd.
URL	http://www.touchngo.com/lglcntr/akstats/Statutes/Title38/Chapter05/Section180.htm

State	Arkansas
Category	Tax incentive
Citation	Ark. Code Ann. §15-72-1002
Title	*Tax Incentives — Re-establishment of Inactive Wells and Fields*
Discussion	The severance tax is reduced from 5% to 4% for marginal wells, which are defined by the state as wellsthat produce an average of less than 10 barrels of oil per day during any calendar month.
URL	http://www.arkleg.state.ar.us/assembly/ArkansasCode/18/15-72-1002.htm

State	Arkansas
Category	Tax incentive
Citation	Ark. Code Ann. §26-58-111
Title	*Rates of Tax*
Discussion	Marginal Gas Wells. there is a reduction in the severance tax from 5% to 1.25% for conventional sources of supply producing less than 100 Mcf/day and for unconventional and tight sand sources of supply producing less than 250 Mcf/day.
URL	http://www.arkleg.state.ar.us/assembly/ArkansasCode/1/26-58-111.htm#http://www.arkleg.state.ar.us/assembly/ArkansasCode/1/26-58-111.htm

State	Colorado
Category	Tax incentive
Citation	Colo. Rev. Stat. § 39-29-105
Title	*Tax on Severance of Oil and Gas*
Discussion	Oil and gas income from “stripper wells,” i.e., wells that produce an average of 15 barrels or less of oil per producing day or 90,000 cubic feet of gas per producing day, is exempt from severance tax. A tax credit is available for 87.5% of ad valorem tax.
URL	

State	Florida
Category	Tax incentive
Citation	Fla. Stat. Title XIV, § 211.02, and Chapter 86-178 (1986)
Title	*Oil Production Tax; Basis and Rate of Tax; Tertiary Oil*
Discussion	Marginal/Stripper Wells. The severance tax is reduced from 8% to 5% for oil wells producing less than 100 barrels per day. Stripper gas is taxed at $0.12 Mcf.
URL	

State	Kansas
Category	Laws and Regulation
Citation	Kan. Admin. Regs. §82-3-304
Title	*Tests of Gas Wells; Penalty*
Discussion	Tests of Gas Wells. This regulation increased the daily minimum gas allowable in Kansas from 150 to 250 Mcf per day and exempts such minimum gas wells from the burden of annual gas well testing (including the required 72-hour shut-in period). it requires that the operator must apply for the exemption and annually report to the Kansas Corporation Commission the well head shut-in pressure for such minimum wells that have been exempted. This includes all coal seam gas wells and conventional gas wells that produce less than 250 Mcf per day. This incentive is designed to minimize the loss of gas production sales and associated expenses of the gas well test (pulling unit time, labor, etc.) for minimum wells.
URL	http://www.kcc.state.ks.us/conservation/cons_rr_110308.pdf

State	Kansas
Category	Tax incentive
Citation	Kan. Stat. Ann. § 79-4217(b)(1)
Title	*Mineral Severance Tax; Imposition of Tax; Rate; Measurement of Production; Exemptions*
Discussion	Marginal/Stripper Wells. The existing severance tax exemptions for marginal/stripper wells was expanded to increase exemptions and to allow for further increases in exemption amounts if oil prices decrease. The two barrels of oil per day exemption on oil produced from a lease or production unit increased to an average daily production of five. The three-barrel exemption for wells with a completion depth of 2,000 feet or more increased to an average daily production of six barrels per day. Further exemptions were provided for if the price of oil decreases. Oil priced at $16 or less now has a seven barrel exemption; should oil drop to $13 per barrel, the exemption is 10 barrels. Tertiary recovery from a waterflood process from wells of 2,000 feet or less now has a six barrel exemption and wells in excess of 2,000 feet have a seven barrel exemption. The exemption is 10 if the oil price reaches $14 per barrel. Tertiary recovery oil priced at $16 or less now has an eight barrel exemption and $14 oil would have a 10 barrel exemption. The exemption for gas severed from a well having a gross value of not more than $81 per day during a calendar month was increased to $87
URL	

State	Kansas
Category	Tax incentive
Citation	Kan. Stat. Ann. § 79-4217(b)(2)
Title	*Mineral Severance Tax; Imposition of Tax; Rate; Measurement of Production; Exemptions*
Discussion	See Kan. Stat. Ann. § 79-4217(b)(1)
URL	

State	Louisiana
Category	Tax incentive
Citation	La. Rev. Stat. Ann. § 47:633
Title	*Rates of Tax*
Discussion	The statute reduces severance taxes on the following categories of wells to stimulate exploration and development of horizontal, new discovery, deep gas, or condensate wells. Stripper Oil Wells. Severance taxes on the following categories of wells were reduced to stimulate exploration and development: (1) Stripper Oil Wells and Incapable Oil Wells producing less than 10 barrels of oil per day are exempt from severance taxes during any month in which oil prices average less than $20 per barrel. When oil prices are greater than $20 per barrel, the severance tax is reduced by 7.5% to 3.125%. Wells producing more than 10 and less than 25 barrels of oil per day with at least a 50% saltwater cut are taxed at 6.25%, a 50% reduction. Marginal Gas Wells. Gas wells producing less than 250 Mcf per day are taxed at a reduced rate of $0.013/Mcf.
URL	http://www.legis.state.la.us/lss/lss.asp?doc=102399

State	Michigan
Category	Tax Incentive
Citation	1929 Mich. Pub. Acts 48
Title	*Marginal/Stripper Wells*
Discussion	Severance taxes are reduced from 6.6% to 4% for production from stripper oil wells. The severance tax rate for all gas production is 5 %. Stripper oil wells are defined by the state as wells with an average maximum daily production less than or equal to 10 barrels per day. Production from marginal oil properties receives the same reduction when average per well production is: 20 barrels or less for properties with average completion depths greater or equal to 2,000 feet but less than 4,000 feet; 25 barrels or less for properties with average completion depths greater or equal to 4,000 feet but less than 6,000 feet; 30 barrels or less for properties with average completion depths greater or equal to 6,000 feet, but less than 8,000 feet; 35 barrels or less for properties with average completion depths of at least 8,000 feet.
URL	http://legislature.mi.gov/doc.aspx?mcl-act-48-of-1929

State	Montana
Category	Tax Incentive
Citation	Mont. Code Ann. § 15-36-304 (1995)
Title	*Production Rates Imposed on Oil and Natural Gas - Exemption*
Discussion	Marginal/Mini Stripper Wells (three barrels per day or less). Oil from a well which produces three barrels per day or less is exempt from production taxes, except the 5% resource indemnity tax. A suspension clause eliminates this tax exemption when West Texas Intermediate crude oil prices reach $38 per barrel for a calendar quarter and reactivates when the price drops below $38 per barrel. Stripper oil wells are defined as those producing 15 barrels per day or less. Marginal/Stripper Wells (10 -15 barrels per day). The production tax rate on the first 10 barrels produced from a stripper oil well is 5.5%. The production tax rate is 9% on the next 10 to 15 barrels. Lower tax rates are provided for stripper well production when the price of West Texas Intermediate crude oil remains below $30 per barrel in a calendar quarter. Montana defines a stripper oil well as a well that produces less than 15 barrels per day.
URL	http://data.opi.mt.gov/bills/mca/15/36/15-36-304.htm

State	Nebraska
Category	Tax Incentive
Citation	Neb. Rev. Stat. § 57-701
Title	*Terms, defined.*
Discussion	A severance tax reduction from 3% to 2% is available for oil wells that produce less than 10 barrels per day.
URL	http://uniweb.legislature.ne.gov/laws/search_range_statute.php?begin_section=57-701&end_section=57-719

State	New Mexico
Category	Tax Incentive
Citation	7-29B-1 NMSA 1978
Title	*Stripper Well Tax Incentive*
Discussion	Marginal/Stripper Wells. The incentive reduces both severance and emergency school taxes for stripper well properties having average daily production of less than 10 barrels or 60 Mcf per eligible well. Severance taxes are reduced from 3.75% to 1.875% or 2 13/16% and emergency school taxes are reduced from 4% to 2% or 3% for gas and from 3.15% to 1.58% or 2.36% for oil during periods of low prices (less than $1.15 and between $1.15 and $1.35 per Mcf for gas and less than $15 and between $15 and $18 per barrel for oil).
URL	

State	New Mexico
Category	Laws and Regulation
Citation	N.M. Stat. Ann. § 19-10-5.1
Title	*Amendment of Lease to Lower Royalty Rate for Oil Wells Under Certain Conditions*
Discussion	State Royalty Reductions. A lower royalty rate (5%) applies to oil wells operated pursuant to a state oil and gas lease if the wells averaged: (i) less than 3 barrels per day for the preceding 12-month period but not more than 5 barrels per day for any month during that 12-month period if producing from shallower than 5,000 feet; and (ii) less than 6 barrels per day for the preceding 12-month period but not more than 10 barrels per day for any month during that 12-month period for production from 5,000 feet or deeper. Certain conditions apply and an application and fee are required.
URL	http://legis.state.nm.us/Sessions/99%20Regular/FinalVersions/house/HB0653.pdf

State	North Dakota
Category	Tax Incentive
Citation	N.D. Admin. Code § 81-09-03-07
Title	*Stripper Well Exemption*
Discussion	Stripper Well Property Determination (No Trigger). This section outlines the requirements for an operator desiring to classify a property as a stripper well property for the purposes of exempting production from extraction taxes. Oil produced by stripper wells is exempt from extraction taxes. Stripper wells are defined as wells with an average daily production during a 12-month consecutive qualifying period of up to 10 barrels per day at a depth of less than 6,000 feet; up to 15 barrels per day at a depth of 6,000 to 10,000 feet; and up to 30 barrels per day at depths greater than 10,000 feet. Stripper wells must be certified by the NDIC. This section was amended in May 2004 to offer operators the opportunity to reclassify already determined single well stripper properties as another type of property.
URL	http://www.legis.nd.gov/information/acdata/pdf/81-09-03.pdf

State	Oklahoma
Category	Tax Incentive
Citation	Okla. Stat. Ann. tit. 68, § 1001.3a (2008)
Title	*Economically At-risk Oil or Gas Leases - Tax Exemptions*
Discussion	Economically At-Risk Oil Leases. Operators may apply to the Oklahoma Tax Commission for a rebate of 6/7ths of the gross production tax upon demonstrating that they operate a lease that is economically at-risk. This particular rebate was previously in effect for calendar years 1997 and 1998 wherein it applied only to at-risk oil leases. Effective July 1, 2005, Oklahoma statutes were amended wherein the rebate applies to both at-risk oil and gas leases. The definition of an economically at-risk lease means any lease operated at a net profit or a net loss, which is less than the gross production tax remitted for such lease in a given calendar year. Operators of at-risk leases shall make application to the Tax Commission to certify that they meet the criteria for being at-risk. Upon approval by the Commission, operators shall file a claim for refund of 6/7ths of the 7% gross production tax remitted for the qualifying year. The at-risk rebate is applicable to calendar years 1997, 1998, 2005, 2006 and 2007. The new version of this law extends the sunset from July 1, 2009, to July 1, 2012.
URL	http://webserver1.lsb.state.ok.us/OK_Statutes/CompleteTitles/os68.rtf

State	Texas
Category	Laws and Regulation
Citation	Tex. Nat. Res. Code Ann. § 32.067
Title	*Marginal Property Royalty Rates*
Discussion	The Texas School Land Board may grant a reduced royalty rate for a period of two years for marginally economic state leases. To qualify, the lease must produce an average of 15 barrels per day per well, or an average of 90 Mcf of gas per day per well. Once the reduced rate is granted, royalty rates will not increase for that lease for two years. Additional reductions can be applied for at the expiration of the two-year period. This tax reduction applies when oil prices average less than $25 per barrel.
URL	http://www.statutes.legis.state.tx.us/Docs/NR/htm/NR.32.htm#32.067

State	Texas
Category	Laws and Regulation
Citation	Tex. Nat. Res. Code Ann. § 86.091
Title	*Marginal Gas Wells and Limits on Well Restrictions*
Discussion	The RRC can exempt marginal gas wells from otherwise applicable production limitations if the wells are located in gas fields without special field rules. A marginal gas well is defined in the Texas Natural Resources Code as a gas well incapable of producing more than 250,000 cubic feet of gas per day under normal operating conditions. Prior to this legislation, the RRC was precluded from exempting individual marginal wells that exist in fields with other wells capable of producing above marginal limits. This legislation replaced the RRC's requirement to limit production from gas wells producing more than 100,000 cubic feet of gas per day unless it is a marginal well in a field for which special field rules are not in effect.
URL	http://www.statutes.legis.state.tx.us/Docs/NR/htm/NR.86.htm#86.091

State	Texas
Category	Tax incentive
Citation	Tex. Tax Code Ann. § 202.057
Title	*Incremental Production Incentive*
Discussion	Leases with wells that averaged seven BOE (barrels of oil equivalent) a day or less in 1996 are eligible for a fifty percent tax reduction on incremental production. The period from September 1, 1997 through December 31, 1998 will be used to determine any increase in production over the 1996 baseline level. The exemption is granted as long as the price of oil, as judged by the Comptroller, remains below $25 (adjusted to 1997 dollars). It is suspended if the price reaches $25 or above for three consecutive months and reinstated when it is below $25 for three consecutive months.
URL	http://www.statutes.legis.state.tx.us/Docs/TX/htm/TX.202.htm#202.058

State	Utah
Category	Tax incentive
Citation	Utah Code Ann. § 59-5-102(5)(a)
Title	*Marginal/Stripper Wells*
Discussion	Stripper wells are severance tax exempt unless the exemption prevents the severance tax from being treated as a deduction for federal tax purposes. Stripper wells are defined as wells that produce an average of less than 20 barrels per day for one year, or 60 Mcf or less of natural gas per day for 90 consecutive days.
URL	http://le.utah.gov/UtahCode/getCodeSection?code=59-5-102

State	West Virginia
Category	Legislation
Citation	HB 2749
Title	*Severance Tax Exemption*
Discussion	Imposes a tax equal to 5% of the gross value produced for the privilege of severing natural gas or oil. Effective taxable periods beginning on or after Jan. 1, 2000. An exemption from the severance tax is granted for natural gas provided free to surface owners. The exemption is granted to low-volume wells, producing less than 5 Mcf of natural gas per day or oil wells that produced an average of less than one-half barrel of oil per day during the calendar year immediately preceding a given taxable period. Natural gas or oil produced from a well that has not produced marketable quantities for five consecutive years immediately preceding the year in which the well is placed back into production and begins producing marketable quantities is also exempted for a maximum of 10 years.
URL	

State	West Virginia
Category	Tax incentive
Citation	WV Code Chapter 11, Article 13A-31
Title	*Severance Tax Exemption*
Discussion	The rule imposes a tax equal to 5% of the gross value produced for the privilege of severing natural gas or oil. Effective taxable periods begin on or after Jan. 1, 2000. An exemption from the severance tax is granted for natural gas provided free to surface owners. The exemption is granted to low-volume wells, producing less than 5 Mcf of natural gas per day or oil wells that produced an average of less than one-half barrel of oil per day during the calendar year immediately preceding a given taxable period. Natural gas or oil produced from a well that has not produced marketable quantities for five consecutive years immediately preceding the year in which the well is placed back into production and begins producing marketable quantities is also exempted for a maximum of 10 years.
URL	http://www.legis.state.wv.us/WVCODE/Code.cfm?chap=11&art=13A#13A

State	Wyoming
Category	Tax incentive
Citation	Wyo. Stat. § 39-14-205
Title	*Exemptions*
Discussion	Marginal/Stripper Wells. Wells which produce an annual average of less than 15 barrels per day while the price of oil is less than $20 per barrel are taxed at 4% (reduced from 6%). When the price of oil is $20 or more, wells producing 10 barrels per day or less receive the 2% tax reduction.
URL	http://michie.lexisnexis.com/wyoming/lpExt.dll?f=templates&eMail=Y&fn=main-h.htm&cp=wycode/1c2a1/1c456/1c4b6/1c4e2

appendices

appendix – economic impact studies

Economists and planners typically use economic impact studies to examine the effects that a new industry or event may have on local or regional economies. In this context, suppose a new factory or other manufacturing facility is contemplating moving into a region. To help determine the tax subsidies or other inducements that authorities may be willing to offer the new business to locate in their area, economic analysis is used to predict the possible positive effects of job creation, enhanced future tax base, and other improved economic results of the arriving industry. With the anticipated rise in employment comes an increase in spending in the local area as workers in the imported facility purchase goods and services with their wages. But this new spending has an ultimate effect in the economy larger that its initial impact. As incumbent merchants sell their products to the recently arrived workers, they have additional income to spend with other local sellers, who then have additional disposable funds, and so on. As each round of spending works its way through the economy, some leakages occur when individuals do not consume all of the new earnings, but ultimately the impact of the new industry will be greater than the initial infusion of spending[7]. This phenomenon is known as the multiplier effect. One of the difficulties in this type of economic analysis is determining the appropriate multiplier.

Multiplier estimations for local economies generally have been based on three types of models: input-output, economic base, and regional income. Each of these approaches has distinct advantages and disadvantages. Depending on the situation being evaluated, any of these methods or a combination of them may be appropriate.

Input-Output models (I-O) appear to be the most reliable, and the most comprehensive, tool for local and regional economic analysis. In this model, an accounting framework called an I-O table is constructed for many industries showing the distribution of inputs purchased and the output sold. Multipliers are then developed for each industry and their interrelations are shown. The most accurate of these models --- constructed using survey techniques --- is costly and time consuming. Some efforts have been made to create short-cut methods (Drake 1976; Kuehn et al. 1985), but the reliability of non-survey I-O models has been questioned (Stevens and Trainer, 1976; Park et al., 1981; Kuehn et al., 1985).

In the economic base technique, multipliers are developed as ratios of total regional income or employment to income or employment in basic (or export) sectors (Olfert and Stabler, 1994). This approach is less costly than other methods, but also has been shown to be less accurate than other

7 A simple multiplier can be calculated as the reciprocal of one minus the sum of a community's marginal propensity to consume (MPC). If a merchant receives an additional $100 and chooses to save 10% of it, then his MPC is .9. The merchant spends $90 somewhere in his community. If the person with whom the initial merchant spent his additional funds also saves 10%, then a third merchant has $81 to purchase additional goods and services. As this additional spending winds its way through the economy, the final effect of the beginning $100 on the local economy is 1/(1 - .9) = 10, the multiplier. In this example, an initial infusion of $100 will have a $1,000 effect on an economy.

procedures in estimating local or regional multipliers. Other criticisms of this approach include questions about its theoretical underpinnings and doubts related to its application (Vias and Mulligan, 1997).

Regional income models can be constructed using published information or from a combination of survey data and published data (Archer, 1976; Thompson, 1983; Glasson et al., 1988; Rioux and Schofield, 1990). Researchers using this method estimate some general relationships from published data and then use survey data to focus on specific relationships. While this method keeps costs low, it still allows for some first-hand information to help estimate critical relationships used to calculate appropriate multipliers.

Almost all of these methods for calculating the multiple impact of a monetary infusion into an economy assume that an industry or event is not a part of the local or regional economy initially or that exports from a region create a flow of income into the region[8]. Whether by the construction of a new power plant, an autonomous increase in government spending, or the importation of a rock concert (Gazel and Schwer, 1997), it is the specific relationships between the new income and the incumbent economic actors that determine the specific multiplier effect. Because of the difficulty in determining an associative relationship, much less a causal one, between the spending patterns of various economic sectors, the validity of specific multipliers is highly speculative under any method. However, a common source for economic multipliers is the Department of Commerce's Bureau of Economic Analysis. As mentioned above, we use their RIMS II (Regional Industrial Multiplier System) multiplier here for Industry 211000, Oil and Gas Extraction.

8 Examples of these studies are those examining the economic impact of universities on their communities. Here it is assumed that students from outside the region are imported into a school, bringing with them funds that would otherwise not be in the business community.

bibliography

Archer, B. H. (1976), "The Anatomy of a Multiplier", *Regional Studies* 10:71-77.

Drake, R.L. (1976), "A Short-Cut to Estimates of Regional Input-Output Multipliers: Methodology and Evaluation", *International Science Review* 1(2): 1-17.

Gazel, R. C. and K. Schwer (1997), "Beyond Rock and Roll: The Economic Impact of the Grateful Dead on a Local Economy", *Journal of Cultural Economics* 21(1): 41-55.

Glasson, J., D. Van De Wea and B. Barrett (1988), "A Local Income and Employment Multiplier Analysis of a Proposed Nuclear Power Station at Hinckley Point in Somerset", *Urban Studies* 24(3): 248-61.

Kuehn, J. A., M. H. Procter and C.H. Braschler (1985), "Comparisons of Multipliers from Input-Output and Income Base Models", *Land Economics* 61(2): 129-35.

Olfert, M. R. and J. C. Stabler (1994), "Community Level Multipliers for Rural Development Initiatives", *Growth and Change* 25(Fall): 467-86.

Park, S. H., M. Mohtadi and A. Kubursi (1981), "Errors in Regional Non-Survey Input-Output Models: Analytic and Simulation Results", *Journal of Regional Science* 21(3): 321-37.

Rioux, J. J. M. and J. A. Schofield (1990), "Economic Impact of a Military Base On Its Surrounding Economy: The Case of CFB Esquimalt, Victoria, British Columbia", *Canadian Journal of Regional Science* 13(1): 47-61.

Stevens, B. H. and G. H. Trainer (1976), "The Generation of Error in Regional Input-Output Impact Models", Regional Science Research Institute Working Paper A 1-76, Amherst, Massachusetts.

U. S. Department of Commerce (1992), *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II)*, U. S. Government Printing Office, Washington, D. C.

Vias, A. C. and G. F. Mulligan (1997), "Disaggregate Economic Base Multipliers in Small Communities", *Environment and Planning A* 29: 955-74.