Deep Water Royalty Relief Act Look Back

Overview

In November 1995 Congress passed the Deep Water Royalty Relief Act (DWRRA). The Government has long expressed a goal of obtaining energy independence. The DWRRA was a bold experiment by Congress in an attempt to move closer to achieving this goal. Enough time has pass so analysis of the impacts of the DWRRA can be done. This paper will look back of the impact of the DWRRA.

DWRRA

DWRRA description and text can be found at http://www.oceancommission.gov/documents/gov_oceans/dwrra.pdf. The portion of the DWRRA that this paper will be examining is issuing of new leases in Central and Western Gulf of Mexico (GOM) in deep water during the period of 1996 through 2000. The act specified the following royalty suspension volumes based on water depth.

Range in Meters	Volumes in Millions of Barrels
200 to 400	17.5
400 to 800	52.5
greater than 800	87.5

A total of 3,401 leases were issued under this criteria. The primary term of these leases could be up to 10 years. That means that 10 year leases issued in 2000 would expire in 2010. Now that it is 2011, it is a proper time to look at the impacts of DWRRA. The impacts of the DWRRA are still being revealed even though 16 years have past. To give some prospective, the Thunder Horse field which predates the DWRRA and is one of the largest fields in the GOM. It took about 20 years from lease issued to initial production. A decade from now the impacts of the DWRRA could look different.

OCS Leasing Landscape

The leasing of the Outer Continental Shelf (OCS) is a complicated process. A good overview of the process can be found at http://www.boemre.gov/ld/PDFs/GreenBook-LeasingDocument.pdf.

The impacts of the DWRRA interacts with several factors: The residuals of the area wide leasing start. The oil and gas resources distribution. The law of diminishing returns. Improvements in technology. Changes in price levels through time. What follows is a description of these factors which the DWRRA interacts with

Area Wide Leasing

The Oil and Gas industry is famous for its boom and bust cycles. This is true for the GOM OCS also. In early 1980's the leasing paradigm changed. The old system was known as tract selection. It had only a few tracts being offered for sale. The new system known as area wide. It is where all tracts that could be potentially sold were available for sale. This generated a large increase in the number of leases issued. Here is the history of leasing for GOM prior to DWRRA:

Year	Leases
1982	171
1983	1040
1984	970
1985	681
1986	142
1987	640
1988	1032

1989	1049
1990	825
1991	591
1992	174
1993	334
1994	560
1995	835

In 1982 were all tract selection sales. 1983 was a transition. The following years were all area wide sales. The lease terms come in 5, 8, and 10 years based on water depth. The deeper the water the longer the term. Due to bathymetry of GOM there are relatively few 8 year leases. In the 80's most of the leases were 5 year leases. The private sector acquires many more leases than it can explore. Those leases without a discovery expire at the end of the primary term. That means many tracts are returned to the government to be sold again. For example a tract sold in 1984 with a 5 year primary term would be returned to the government in 1989 and be part of the inventory available for sale in 1990. The area wide leasing spike in leasing occurred in 1983 and 1984 followed another spike in 1988, 1989 and 1990. Note that the low points in leasing in 1986 and 1992 are 6 years apart. Similar patterns occurs for 8 and 10 year term tracts. So the 10 year term sold during at the being of area wide leasing program were coming back into the inventory about the same time as DWRRA incentives began in 1996. As the data shows leasing activity was ramping up in 1994 and 1995.

One of the challenges for this study is separating the impacts of releases of tracts from the area wide leasing boom and impacts of incentives from DWRRA. These waves will be referred to as echoes.

Oil and Gas Resource Distribution

Hydrocarbon deposits have a wide distribution of size. In 2010 1,359 leases had some oil production. However just 22 leases generated 50% of the total production. A few number of leases can dramatically impacts the numerical levels of production.

Law of Diminishing Marginal Returns

Deep water GOM is a large geographic area, but it is finite. With well over a decade of area wide leasing prior to the DWRRA, it is reasonable to expect that many of the best tracts would have been sold prior to the DWRRA. Of the largest 25 fields in the GOM. Seven are in deep water:

Rank	Nickname	Area Block	Year Lease Issued
1	Mars-Ursa	MC 807	1985
4	Thunder Horse	MC 778	1988
6	N. Thunder Horse	MC 776	1988
8	Atlantis	GC 743	1995
14	Tahiti	GC 640	1998
16	Auger	GB 426	1985
24	Great White	AC 857	1997

The top 4 were leased prior to DWRRA, as were 5 of the top 7 fields. When DWRRA incentives came into effect many of the best tracts have already been sold. The most recent estimates of field sizes in the GOM is located at http://www.gomr.boemre.gov/homepg/offshore/fldresv/2006-Table4.pdf.

Improvement in Technology

The technology of the oil and gas industry is evolving. For example, the development of 3D seismic data has enable the discovery of deposits which were not observable with the older 2D seismic approach. This improved technology came into use during the DWRRA lease primary term period.

Prices

The price of oil is dynamic. Prior to and during the DWRRA oil was around $20 a barrel. In the 2000's price of oil increased and peaked in 2008. The DWRRA leases had very favorable prices of oil after they were leased. In the 90's with an oil price of $20 that means of royalty of $2.50 (20 * 0.125) for a net $17.50. In the mid 00's when the production decision is made the price of oil is now in $40 range. The net is now $40 an increase of $22.50. However the DWRRA incentives was only $5 (40 * 0.125) of the total increase. The gain in oil prices had a larger impact in net revenues than DWRRA incentives.

Year	West Texas Intermediate
1990	24.50
1991	21.54
1992	20.57
1993	18.45
1994	17.21
1995	18.42
1996	22.16
1997	20.61
1998	14.39
1999	19.31
2000	30.37
2001	25.93
2002	26.16
2003	31.07
2004	41.49
2005	56.59
2006	66.02
2007	72.20
2008	100.06
2009	61.92
2010	79.45

Source: BP Statistical Review of World Energy June 2011.

Summary of the DWRRA OCS Leasing Landscape

The echo of the start of area wide leasing approach and the incentives of DWRRA are concurrent. Most of the production is from a comparative few leases. DWRRA incentives and technology improvement point to increased production. Diminishing marginal returns suggests that incremental production declines. The challenges to separate the various influences.

Outcomes of the DWRRA

What follows are the outcomes from the DWRRA so far. As comparison the experience of leasing activity in 200 meters or greater in the five years (1991 thought 1995) prior to the DWRRA will be used as a comparison. For example in 1993 a total of 71 deep water leases were issued with 15 with 5 year primary term, 32 with 8 year term, and 24 with a 10 year term. The year 1993 was prior to the DWRRA incentives.

Leasing

Year of Sale	Total	5 Year Term	8 Year Term	10 Year Term	
1991	195	41	57	97	
1992	37	13	17	7	
1993	71	15	32	24	Pre Act
1994	102	29	34	39	
1995	299	47	85	167	
1996	695	41	103	551	
1997	1153	53	124	976	
1998	1112	47	92	973	DWRRA
1999	213	20	19	174	
2000	228	14	28	186	

With the start of DWRRA there is a large jump in leasing activity. In the five years prior to act the number of leases sold was 704 as compared to 3401 under DWRRA era. That is a nearly five fold increase in activity. DWRRA clearly generated an increase in leases issued. The question did the DWRRA incentives result in increased production.

Another factor impacting the leasing activity was resale of previously owned tracts. This is displayed in the following table.

First Time Leasing Activity

Year of Sale	Total	First Time Leases	Percentage	
1991	195	125	0.64	
1992	37	12	0.32	
1993	71	33	0.46	Pre Act
1994	102	45	0.44	
1995	299	132	0.44	
1996	695	440	0.63	
1997	1153	817	0.70	
1998	1112	847	0.76	DWRRA
1999	213	111	0.52	
2000	228	103	0.45	

Back to 1993 deep water leases, there were 71 leases issued, but only 33 of those were first time lease of the tract. An important segment of the leasing activity is sale of previously owned tracts. This is true for both prior and during the DWRRA. During DWRRA there were many first time leases.

The first question is to quantify the impact of DWRRA as opposed to the other factors. What follows is a back of the envelop approach attempting to measure the impact. Consider this table:

Water Depth	Category	Pre Act Leases	DWRRA period Leases
Shallow	Not First	1482	1783
	First	281	207
Deep	Not First	357	1083
	First	347	2318

This table show the leasing by shallow and deep water and by Not First and First time leasing of the tract. The Shallow and DWRRA period show a growth in leasing activity. A much larger gain is found in deep water DWRRA period. The shallow water does not have the DWRRA incentives while the deep water does. This presents a way of separating the gain due DWRRA and other factors.

Water Depth	Category	Pre Act Leases	DWRRA period Leases	Ratio
Shallow	Not First	1482	1783	1.203
	First	281	207	0.737

Now apply the ratio to project deep water leasing without the incentives:

Water Depth	Category	Pre Act Leases	DWRRA period Estimate without incentives	
Deep	Not First	357	357 * 1.203 =	429
	First	347	347 * 0.737 =	256

Now computing the estimated gain in leasing due to the DWRRA incentives

Category	Leases	Estimate	Due to Incentives
Not First	1083	429	654
First	2318	256	2062

The DWRRA did generate a large increase in leasing. This is the first finding of the study.

This is a table of production in 2010 from deep water leases issued in the year listed.

Production in 2010

Year of Sale	Oil in BBLs	Gas in MCF	
1991	27,025,490	95,168,450	
1992	0	0	
1993	41,264,330	176,644,250	Pre Act
1994	200,426,540	297,235,850	
1995	542,623,130	421,256,700	
1996	360,891,240	534,217,860	
1997	68,155,850	711,198,600	
1998	855,639,490	928,490,540	DWRRA
1999	15,185,140	163,550,500	
2000	201,664,070	313,917,790	

First notice there is a considerable variation in the production amounts. Next there is not much relationship between the number of issued and the associated production from those leases. There is more production from DWRRA leases.

A way of examining the production is to see, if it is coming from first time leases or leases that has been previously sold. This is found in the next table.

Production in 2010 First Time Leasing or Not

Order	Pre Act Oil	DWRRA Oil	Pre Act Gas	DWRRA Gas
First	346,365,180	1,031,833,410	235,851,770	1,021,037,710
Not First	464,974,310	469,702,380	754,453,480	1,630,337,580

An important part of the production from both Pre Act and DWRRA lease era leasing came from previously leased tracts. In gas production Pre Act and DWRRA leases was dominated by production from previously leased tracts. This indicates at least for gas production the echo the start of the area wide boom has a larger impact than DWRRA.

The first time leases had a major contribution to the DWRRA Oil production. Investigating the details of the production a pattern emerged. Just four leases generated about 80% of the oil production. These four leases had the attribute of being considered as non-viable. Non-viable means that with technology available, the Government determined the lease at time of sale there are no economic resources on the lease. *In the case of these leases, the improvement of the technology (3D seismic) revealed very large deposits after the sale.* This is the second finding of the study. The reserves on these four leases are so large that they would have been produced without the DWRRA incentives. What follows is a table showing the production of the four leases.

Production in 2010 First Time Leasing DWRRA from 4 Non-Viable Leases

Category	DWRRA Oil	DWRRA Gas
4 NV First	837,749,670	442,066,620
All First	1,031,833,410	1,021,037,710

The four non-viable leases are G16641, G20082, G20084, and G20085. All of the tracts associated for these leases were available for well over a decade without receiving a bid.

Another way of looking a the production data is a table similar to leasing activity.

	Oil Production (BBLs)			
Depth	Category	Pre Act Leases	DWRRA Period Leases	Ratio
Shallow	Not First	36,383,040	117,419,590	3.23
	First	2,351,190	65,930	0.03
Deep	Not First	464,974,310	469,702,380	1.01
	First	346,365,180	1,031,833,410	2.98

The shallow water results are surprising. Over a three fold increase of production from previously sold tracts. First time shallow tracts had almost no contribution. In deep water basically unchanged production from previously sold tracts. A three fold increase of production in deep water DWRRA tracts. As previously noted most of that production came from those four non-viable tracts. Repeating the table

without those non-viable four tracts yields:

Oil Production (BBLs) excluding the four non-viable tracts

Depth	Category	Pre Act Leases	DWRRA Period Leases	Ratio
Shallow	Not First	36,383,040	117,419,590	3.23
	First	2,351,190	65,930	0.03
Deep	Not First	464,974,310	469,702,380	1.01
	First	346,365,180	194,083,740	0.56

With those four non-viable tract excluded the oil production from deep water first time tracts is poor.

Now look at Gas Production:

Gas Production (MCF)

Depth	Category	Pre Act Leases	DWRRA Period Leases	Ratio
Shallow	Not First	605,872,670	694,294,740	1.15
	First	20,940,450	26,938,090	1.29
Deep	Not First	754,453,480	1,630,337,580	2.16
	First	235,851,770	1,021,037,710	4.33

In shallow water there is modest growth in gas production and larger growth in deep water. But in both cases previously owned tracts generated most of the gas production.

Looking at the data without the 4 non-viable tracts yields:

Gas Production (MCF) excluding the four non-viable tracts

Depth	Category	Pre Act Leases	DWRRA Period Leases	Ratio
Shallow	Not First	605,872,670	694,294,740	1.15
	First	20,940,450	26,938,090	1.29
Deep	Not First	754,453,480	1,630,337,580	2.16
	First	235,851,770	578,971,090	2.45

The observation that previously owned tracts are the primary source of gas production is confirmed. This is the third finding of the study.

Leases in Production in 2010 First Time Leasing or Not

Another way of looking at the production data is by the number of leases that went to production. Which is displayed in the following table.

Year of Sale	Not First	First	
1991	8	1	
1992	0	0	
1993	5	2	Pre Act
1994	4	2	
1995	14	2	
1996	13	5	
1997	9	7	
1998	17	3	DWRRA
1999	5	0	
2000	13	5	

The data shows that many more deep water leases in production during 2010 were from leases that were previously leased. Leases that had been previously sold contributed higher counts than first time leases.

Displaying the data comparing shallow and deep:

Producing Leases in 2010

Water Depth	Category	Pre Act Leases	DWRRA period Leases	Ratio
Shallow	Not First	92	128	1.39
	First	5	3	0.60
Deep	Not First	31	57	1.84
	First	7	20	2.86

Again, leases that had been previously sold contributed higher counts than first time leases.

Summary of Results

- DWRRA generated a large surge in leasing, but leasing activity and production are not related.

- The large share (80%) of the DWRRA oil production came from just four previously unleased tracts. These four leases at the time of sale were considered as non-viable. Technology improvements (3D seismic) revealed the unknown resources.

- Leases that were previously sold contributed a large majority of the gas production for both Pre Act era (1991-1995) and DWRAA era (1996-2000). This is an effect from the echo of the area wide leasing program. This is also true in shallow water

The second and third finding show that DWRRA was not a primary driver of neither oil nor gas production which leads to the fourth and final finding of the study.

- Based on the current data available the incentives from the DWRRA were not the primary driver of oil nor gas production from deep water leases issued during 1996-2000 time period. The primary effects were from technology improvements and the echo of the area wide leasing.