

Report for Congress

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Outer Continental Shelf Oil and Gas: Energy Security and Other Major Issues

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Summary

The Outer Continental Shelf (OCS) contains significant energy resources. The principal authority for OCS development is the OCS Lands Act of 1953, as amended (43 USC 1331). The OCS is made available for oil and gas exploration and development subject to environmental protection and competing public needs.¹ A number of OCS issues have been addressed through the annual appropriation process, including offshore leasing moratoria, lease sale 181 (a controversial Florida lease sale), and the royalty-in-kind program.

The leasing moratoria, which began in Congress with the FY1982 Interior Appropriations Act (P.L. 97-100), prohibited new offshore California leases. The moratoria were imposed because many coastal states and environmental groups convinced Congress that leasing tracts in environmentally sensitive areas might lead to activities that could cause economic or irreversible environmental damage. Eventually the moratoria were expanded to include New England, the Georges Bank, the mid-Atlantic, the Pacific Northwest, much of Alaska, and a portion of the Eastern Gulf of Mexico. Lease sale 181, in the Eastern Gulf of Mexico, was controversial because of its perceived threat to local economies and the environment. The original leasing area of 5.9 million acres, estimated to contain nearly 8 trillion cubic feet (tcf) of natural gas and 396 million barrels of oil, was reduced to 1.47 million acres after intense pressure from environmentalists and Florida officials. Lease buybacks or lease swaps are particularly important in light of congressional interest in broadening the offshore California moratoria. Companies already unable to develop their California lease holdings were seeking compensation through the Senate version of the energy bill (H.R. 4) in the 107th Congress. Additionally, there was legislative interest related to extending the Deepwater Royalty Relief Act. Environmental concerns from offshore oil and gas development generally include oil spills, drilling discharges, seismic surveys, and onshore damage.

The Gulf of Mexico (GOM) is cited by the Energy Information Administration (EIA) as the most promising region for new additions to U.S. oil reserves because it led the nation in total discoveries with 423 million barrels in 1999 (despite its net loss of reserves)² and 702 million barrels in 2000. The proposed Minerals Management Service (MMS) 2002-2007 5-Year Program also lists the GOM as the most promising area. Exploring for offshore oil and gas has changed over the past several years. New technology has led to greater exploration and development into deeper water made possible by advances in high-quality 3-dimensional seismic surveying and processing. New drilling technology and new drilling rigs allow for increased drilling at greater depths and accuracy, resulting in higher production rates and lower-cost production.

This report will not be updated further.

¹ 43 USC 1332.

² Net reserves equal the amount of oil and gas added to the reserve category less production.

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Outer Continental Shelf Oil and Gas: Energy Security and Other Major Issues

Introduction and Overview

Offshore oil and gas development occurs in both state and federal waters. The U.S. Outer Continental Shelf (OCS), which is leased by the federal government, is composed of lands beyond the generally 3-mile area of state jurisdiction in most offshore waters and beyond the 10-mile area of state jurisdiction in the Gulf of Mexico waters off Texas and Florida. The OCS contains substantial amounts of oil and gas reserves and resources. This resource is made available for development subject to environmental protection and competing public needs.³ The principal authority for OCS development is the OCS Lands Act of 1953, as amended (43 USC 1331, et seq.).

Recent events have increased concerns in Congress regarding the nation's energy security.⁴ What does it mean to be energy secure and how does the U.S. OCS fit into the energy security equation? Answers to these questions will help explain part of the energy supply picture that is important to understanding broader U.S. energy policy.

Energy security, through enhanced domestic supply, is not a new concern but is being pursued by the White House and some Members of Congress with greater emphasis after the September 11 terrorist attacks on U.S. soil. Energy security it is argued, could be enhanced if offshore development were to increase in the U.S. Gulf of Mexico (GOM). There is strong interest among the major oil firms in this region because of the resource potential and the improvement of deepwater technology. U.S. offshore oil and gas have become a larger component of U.S. domestic supply as production from onshore federal leases has declined 19% over the past 10 years (see Table 1). Onshore oil production overall has declined by 36% since 1991.⁵

Increasing offshore production would add importantly to future U.S. oil supply – now accounting for more than 25% – but will not displace enough imports to

³ 43 USC 1332.

⁴ As defined by some experts, Energy Security is: Assurance of (1) adequate supplies of energy at reasonable prices compatible with economic growth; and (2) the ability to buffer the nation and its economy from a disruption and uncertainty in supply and the price spikes that normally accompany severe shortages.

⁵ Energy Information Administration, *Annual Energy Outlook, 1994-2000, Oil and Gas Supply*.

reduce U.S. reliance on foreign oil.⁶ A decline in oil imports overall would take drastic reductions in the demand for oil, particularly in the U.S. transportation system, or much more U.S. production than projected. The situation for natural gas has not been the same as for oil. U.S. natural gas production rose by about 8% during the 1990s, although it has recently declined. Offshore gas production has declined slightly over the same period.

Table 1. Annual Offshore Oil and Gas Production on Federal Leases, 1991-2001

Years	Offshore Oil (million barrels)	% of Total U.S. Production	Offshore Natural Gas (trillion cubic feet)	% of Total U.S. Production
1991	315.7	11.9	4.5	25.4
1992	353.7	13.5	4.7	26.4
1993	362.7	13.5	4.5	25.0
1994	369.5	15.2	4.65	24.7
1995	408.9	17.0	4.7	25.2
1996	438.0	18.5	5.0	26.6
1997	478.8	20.0	5.1	26.9
1998	476.6	21.0	4.8	25.3
1999	513.3	24.0	5.0	26.6
2000	567.9	26.7	4.7	24.7
2001	571.0	27.0	4.6	24.5

Source: Minerals Revenues, 2001, MMS.

There are a number of policy issues relating to offshore oil and gas development. Some are being addressed within the context of the renewed debate on energy security. This report is presented in four major sections: 1) a description of the OCS leasing system, 2) a discussion of current issues, 3) of OCS resources, and 4) of offshore technology.

⁶ DOE, EIA International Outlook, 2001, p. 38

OCS Leasing System

The Outer Continental Shelf Lands Act (OCSLA) of 1953, as amended, provides for the leasing of OCS lands in a manner that protects the environment and returns to the federal government revenues in the way of bonus bids, rents, and royalties. OCSLA requires the Secretary of the Interior to submit 5-year leasing programs that specify the time, location and size of the leases to be offered. Each 5-year leasing program entails a lengthy multi-step process including environmental impact statements. After a public comment period, a final proposed plan is submitted to the President and Congress. The latest plan went into effect July 1, 2002.

The offshore leasing program is administered by the Minerals Management Service (MMS), an agency within the Department of the Interior. The MMS is scheduled to conduct 20 oil and natural gas lease sales during the current 5-year program from 2002-2007. Half of those sales will be in the Western or Central Gulf of Mexico (GOM), two in the Eastern GOM and the remainder around Alaska. Alaska's lease sales will be held in the Beaufort Sea, Norton Basin, Cook Inlet (not referenced on map below), and the Chukchi Sea/Hope Basin (see figure 1).

Figure 1. MMS 5-Year Program Areas



Lease sales are conducted through a competitive, sealed bonus bidding process and leases are awarded to the highest bidder. Successful bidders make an up-front cash payment, which is called a bonus bid, to secure a lease. A minimum bonus bid is determined for each tract offered. Over the past ten years annual bonus revenues have ranged from \$85 million in 1992 to as high as \$1.4 billion in 1997. Bidding on deepwater tracts in the mid-1990's led to the surge in bonus revenue.⁷ Bonus bids totaled \$632.5 million in 2001. In addition to the cash bonus bid, a royalty rate of 12.5% or 16.66% is imposed on the value of production, or the royalty is received "in-kind."⁸ The rate could vary higher than 16.66% depending on the lease sale. Annual rents are \$3-\$5 dollars per acre, with lease sizes generally ranging from 2,500-5,760 acres. Initial lease terms of 5-10 years are standard and leases continue as long as commercial quantities are being produced. Bonding requirements are \$50,000 per lease and as much as \$3 million for an entire area. The Secretary may reduce or eliminate the royalty established by the lease in order to promote increased recovery.

Table 2. Oil and Gas Revenues from Federal Offshore Leases, Fiscal Years (FY) 1991-2001
(\$ millions)

Year	Offshore			Total Offshore	Total Revenues (onshore & offshore)
	Bonuses	Royalties	Rents		
1991	338.9	2,283.5	78.1	2,793.2	3,926.4
1992	84.8	2,301.8	59.7	2,561.4	3,869.3
1993	126.5	2,476.9	39.8	2,856.9	4,072.3
1994	331.4	2,334.0	39.9	2,915.3	4,222.4
1995	414.0	2,125.4	87.3	2,723.7	3,829.7
1996	878.2	3,085.4	158.7	4,253.6	5,494.0
1997	1,410.7	3,444.6	228.4	5,259.2	6,721.8
1998	1,320.3	2,704.0	258.5	4,322.6	5,608.4
1999	249.3	2,611.7	208.5	3,188.4	4,560.2
2000	441.8	4,094.6	207.8	5,209.7	7,123.8
2001	632.5	6,047.3	188.5	7,500.4	10,008.7

Source: Mineral Revenues, 2001.

⁷ Department of the Interior, FY2002 Budget Justifications, p. 63.

⁸ A royalty-in-kind payment would be in the form of barrels of oil or cubic feet of natural gas.

The MMS administers the Offshore Minerals Management (OMM) Program and the Minerals Revenue Management (MRM) Program. OMM administers competitive leasing on outer continental shelf lands and oversees production of offshore oil, gas and other minerals. MRM collects and disburses bonuses, rents, and royalties paid on federal onshore leases, OCS leases and Indian mineral leases. MMS anticipates collecting about \$4.2 billion in revenues in FY2003 from offshore and onshore federal leases.⁹

Current Policy Issues

OCS issues include: offshore moratoria, lease sale 181 (a controversial Florida lease sale), the royalty-in-kind program, environmental concerns, and the distribution of federal mineral receipts. Many of these issues have been addressed through the appropriations process.

Offshore Moratoria

The offshore leasing moratoria began with the FY1982 Interior Appropriations Act (P.L. 97-100), which prohibited new leases offshore of California. The imposition of other moratoria came about after many coastal states and environmental groups contended that leasing tracts in environmentally sensitive areas might lead to activities that could cause economic or irreversible environmental damage. Eventually the moratoria were expanded to include New England, the Georges Bank, the mid-Atlantic, the Pacific Northwest, much of Alaska, and a portion of the Eastern Gulf of Mexico. Because of environmental and economic concerns, Congress, for the past two decades, has supported annual moratoria on leasing and drilling in the OCS off the areas mentioned above. Congress enacted the moratoria for each of fiscal years 1982-1992 through the Interior Appropriations bill.

President George H.W. Bush, in 1990, responding to pressure from the states of Florida and California, and others concerned about protecting the ocean and coastal environments, issued a Presidential Directive ordering the Department of the Interior (DOI) not to conduct offshore leasing or preleasing activity in places other than Texas, Louisiana, Alabama, and parts of Alaska until 2000. In 1998 President Clinton extended the offshore leasing moratoria until 2012. In the 107th Congress, the OCS moratoria was an important issue for the Bush Administration, particularly as energy security (including access to more domestic oil and gas resources) receives greater attention.

Despite the high level of interest in increasing the nation's energy supply, the Secretary of the Interior announced in December 2001 that it would be up to the states to request a study of the potential oil and gas resources off their shores. In addition Secretary Norton would leave it up to the states to reconsider the leasing moratoria off their coasts. Thus, there would be no overarching executive branch role in trying to lift the moratoria. Reaction to this stance has been somewhat mixed because, as some see it, she leaves the door open to leasing in areas now under the

⁹ MMS Budget Justifications FY2003, p. 1

moratoria even though the Bush Administration officially supports the moratoria. However, no states have expressed interest in lifting the moratoria.

OCS Lease Buybacks

Lease buybacks take place when the federal government purchases a lease back from the leaseholder. Over the past decade the Department of the Interior halted development of several leases in environmentally sensitive areas off the North Carolina coast. The leaseholders initiated court action demanding compensation from MMS, on the grounds that the government's action constituted a "taking" of property rights. In 2000, the Supreme Court¹⁰ ordered the government to repay Mobil Oil Exploration and Producing Southeast, Inc., over \$156 million for nullifying its 1981 lease contract.

Legislation (S. 771) that would have required the government to repurchase leases sold to companies in areas now off-limits to drilling in the Eastern Gulf of Mexico and ban additional lease sales in the Eastern Gulf was introduced in 2001 by Senator Graham. The bill eventually died. Lease buyback is seen by many as an important policy tool. In May 2002, the Bush Administration announced its plans to buy back oil and gas leases from Chevron, Conoco and Murphy oil companies off Pensacola, Florida, for \$115 million in an area known as the Destin Dome. Included in the announcement, were oil and gas lease buybacks in the Everglades National Park, Big Cypress National Preserve and Ten Thousand Islands National Wildlife Refuge that would require approval by Congress.

Offshore California. Companies unable to develop their existing California lease holdings are seeking compensation from the federal government. Congress has banned drilling in the Santa Maria Basin and Santa Barbara Channel areas where there are leased tracts. The companies contend that over a billion dollars has already been spent to obtain the leases.¹¹ In previous buyback settlements, firms have recouped their bonus bid payments but lost possible future returns that would have been earned if commercial production were achieved¹². In the case of the California offshore leases, the Clinton Administration continued to extend the leases (through suspensions) that were granted between 17-33 years ago, before the moratoria were imposed. A federal statute, the Coastal Zone Management Act (P.L. 92-583), was amended in 1990 to allow a state to determine whether development of oil and gas leases was consistent with the state's coastal zone management plan. The states objection could prevent development of the oil and gas leases.

¹⁰ Supreme Court case Mobil Oil Exploration and Producing Southeast, Inc. v. United States, 530 U.S. 604 (2000)).

¹¹ Inside Energy with Federal Lands, September 3, 2001.

¹² Estimating future revenues with limited drilling is difficult at best because it is not possible determine the extent (if any) or quality of hydrocarbons. According to the MMS the leased area contains an estimated 1 billion barrels of oil and 500 billion cubic feet of unproved reserves.

The last suspension by MMS, in 1999, extended 36 out of the 40 existing leases at issue offshore California. This action was taken to give lease holders more time to “prove up” oil reserves and for MMS to show consistency with state plans. On June 20, 2001, the U.S. District Court for the Northern District of California struck down the MMS suspensions, allowing the leases to expire, because it held that MMS failed to show consistency with the state’s coastal zone management plan. The Bush Administration appealed this decision to a three-judge panel of the Ninth Circuit of Appeals in San Francisco on January 9, 2002 and has proposed a more limited lease development plan that involves 20 leases, using existing platforms and other necessary infrastructure. Oral arguments in the appeal were heard on June 10, 2002 and a decision is pending.

A government buyback of the remaining 16 leases is under discussion as part of that limited development proposal. However, the Secretary of the Interior has noted that the California case has not yet reached the maturity for a Florida-type buyout. The decision to appeal reportedly was made in part to protect the property rights of the lessees and also to promote the development of domestic oil and gas resources.¹³ California has rejected the Administration’s proposal to pursue more limited drilling for oil and gas resources off the coast.

Also, legislation was proposed in the 107th Congress (S. 1952) by Senators Boxer and Landrieu to compensate companies holding leases offshore California by giving them credits to acquire oil and gas leases in the Gulf of Mexico. The credits offered could be as much as \$3 billion. The media reports that at least one of the companies involved is endorsing the legislation.¹⁴

The California offshore development issue has also led to a breach-of-contract lawsuit. Nine oil companies are seeking \$1.2 billion in compensation for the undeveloped leases. The companies allege that MMS failed to conduct consistency determinations required by the court. The suit was filed on January 9, 2002 with the Court of Federal Claims in Washington D.C.

Environmentalists and California officials support the termination of the leases and a halt to further activity in the disputed area located offshore Santa Barbara. The Administration, however, would like to see at least some oil and gas development as part of its energy security strategy.

Lease Sale 181

A Bush Administration plan (originating in the Clinton Administration) to lease 5.9 million acres in the Eastern GOM was controversial and sparked considerable debate, although this area was not under a leasing moratoria. No Eastern GOM lease sale had taken place since 1988. The lease sale 181 area was considered by many to be too close to the shore and to environmentally sensitive areas. Some tracts were as close as 17 miles from the Florida and Alabama coastline. The major concern of

¹³ *Platts Inside Energy with Federal Lands*, 2/25/02, p. 18.

¹⁴ *Platts Inside Energy with Federal Lands*, 9/3/01, p. 11.

those in Florida opposing the sale was impairing the value of tourism to the state. If an accident were to occur, causing an oil spill, it could damage the state's beaches and thus the tourist industry. It also could severely affect the marine environment, opponents contended.

The original area of 5.9 million acres, estimated to contain nearly 8 trillion cubic feet (tcf) of natural gas and 396 million barrels of oil, was reduced to 1.47 million acres after intense pressure from environmentalists and state officials. The reduced lease sale 181 offered 256 blocks containing an estimated 1.25 tcf of natural gas and 185 million barrels of oil. The sale took place December 5, 2001.

In the first session of the 107th Congress, the House adopted an amendment to the FY2002 Interior Appropriations Act (P.L.107-63) that would have delayed by six months Administration plans to proceed with lease sale 181. The amendment passed by a wide margin (247-164), but was preceded by sharp debate. Supporters of the amendment cited the risk to the shoreline and marine environment in the event of an accident. Opponents argued that the potential addition to U.S. energy security should not be traded off against what they called a very small risk to the environment.

The House vote on the FY 2003 Interior appropriations was likely a contributing cause of the Administration's announcement a week later, on July 2, 2001, that lease sale 181 would include only 1.47 million acres of the 5.9 million originally proposed. The lease sale described by Secretary of the Interior Gale Norton was a compromise worked out between the affected states and the Administration. The Secretary also indicated that the blocks not included in the notice of sale would also not be included in the proposed new five-year leasing program for 2002-2007. The Senate version did not have a provision to postpone the sale and the House position to postpone the lease sale was abandoned in conference. However, environmental groups threatened to file a lawsuit to halt development in the lease sale area because of the danger they say is posed to marine life.¹⁵

Royalty-in-Kind

Another amendment to the FY2002 Interior bill (P.L.107-63) offered by Representative Maloney, and approved by a voice vote, requires that MMS ensure that the value of oil or gas the government receives as royalty-in-kind (RIK) is equal to or greater than the revenues that the government would receive under the royalty-in-value programs. The MMS already has the authority to collect its royalty payments in-kind but has used this method primarily for its small refiner program.

Under royalty-in-kind programs, the government receives the royalty in the form of crude oil, not money. The amendment requires that any RIK oil and gas be no less valuable than the calculation of the monetary royalty under guidelines for royalty-in-value. The amendment was not controversial, but was seen as codifying the current royalty program. Controversy over the industry's valuation of the oil and gas has been a chronic problem for federal royalty collection programs

¹⁵ Environmental Groups Plan To Fight New Oil/Gas Leases in East Gulf, Inside Energy with Federal Lands Dec. 10, 2001, p. 15.

A second RIK program, a more extensive pilot program than the first, is currently underway for oil in Wyoming and oil and natural gas in the Gulf of Mexico. A draft assessment of the Wyoming oil sales concludes that taking royalties in-kind is a viable option. Additional assessments of the pilot are still in progress. A previous RIK feasibility study completed in 1995 concluded that more widespread use of the RIK program could be feasible with natural gas in the GOM having the greatest chance of success.

Environmental and Coastal Concerns

Environmental concerns about offshore oil and gas development generally include oil spills, drilling discharges, seismic surveys and onshore damage. Oil spills from oil and gas operations can kill fish and other marine life. Of greatest concern, perhaps, is the possibility of a “blowout,” which is an uncontrolled release of hydrocarbons that could last from several hours to weeks. Very few blowouts have occurred in U.S. waters. A great deal of attention has been focused on the impact of offshore oil spills since the major Santa Barbara oil spill in 1968.

Drilling discharges consist of water-based drilling mud and rock cuttings. The rock cuttings are the pieces of rock (about the consistency of sand or silt) generated by the crushing action of the drill bit. These discharges introduced into the marine environment may contain significant amounts of toxic metals. The amount released depends on the type of well, the depth drilled and the types of rocks the drill penetrates. As much as 3,200 cubic meters of rock cuttings and mud combined can accumulate from an exploratory well.¹⁶ Many companies re-circulate and reuse their drilling muds. However, some muds and cuttings do accumulate on the seabed floor and damage marine life.¹⁷

Seismic surveys, with their use of air guns and other high-noise devices, create loud enough noises to affect marine life. Some marine mammals show avoidance within 5 miles of activity, and some fish can be killed if close enough to the sound. Onshore effects of offshore infrastructure can include damage to coastal wetlands, salt marshes, and to activities associated with the economic base such as tourism and recreation.

Conservation and Reinvestment Act

Some coastal states are seeking a share of revenues currently paid to the federal treasury by the private sector for leasing and producing OCS oil and gas deposits. The funds would be used in part to address the adverse onshore effects of these energy activities. Currently, the affected states receive revenue indirectly from offshore oil and gas leases in federal waters. This is in contrast to states with onshore leases on federal lands. Legislation referred to as the Conservation and Reinvestment

¹⁶ *Exploring For Offshore Oil and Gas*, CEF Consultants, Limited, Halifax, Nova Scotia, November 1998.

¹⁷ *Offshore Drilling and Oil Spills*, Environmental Media Services, Natural Resources Defense Council, May 8, 2001.

Act (CARA), introduced in the 106th and again in the 107th Congress (H.R. 701 in both Congresses) would allocate about \$3 billion annually in OCS oil and gas revenues to federal and state resource acquisition and protection, urban recreation, wildlife protection, and related purposes. Coastal states adjacent to offshore oil and gas activities would receive a disproportionately large share. CARA legislation passed the House in the 106th Congress, and has been approved by the House Resources Committee in the 107th Congress. The bill died again in the 107th Congress.

A major question is what portion of OCS revenues, if any, should be provided to the states for environmental protection. The CARA proposals address this question both by proposing a total annual allocation, and by using formulas that would provide the most money to states where the most offshore activity is occurring. Some supporters of CARA would prefer an allocation more like that with onshore revenue distribution (50% to states, except Alaska at 90%). However, the benefits of such a formula would be uneven, with the largest producing states – California, Texas and Louisiana – receiving the vast majority of the revenue. Others, who support more funding for the purposes listed above, especially representing small, land-locked states, prefer a different formula giving more to other states. Offshore oil and gas revenues fluctuate annually and in some years funding levels may not reach authorized levels, and some observers believe this legislation could create a powerful constituency to expand oil and gas development activities, regardless of current prohibitions.¹⁸

Federal Distribution of OCS Revenues

Federal revenues from offshore leases were estimated at \$7.5 billion in FY 2001 by the MMS. Over the previous ten years (1991-2000) revenues from federal OCS leases had reached as high as \$5.26 billion in 1997. Revenues were as low as \$2.5 billion in 1992 and were \$3.2 billion in 1999. Higher prices for oil and gas are the most significant factors in the revenue swings. Of the \$7.5 billion revenue in 2001, \$6.0 billion was from royalties (see Table 2).

These revenues are split among various government accounts. Revenues from the offshore leases are statutorily allocated among the coastal states, Land and Water Conservation Fund, the National Historic Preservation Fund, and the U.S. Treasury. For distribution of all revenue from federal leases, see figure 2. The states share from offshore leases was \$141.3 million out of \$1,194.3 million in total state receipts.

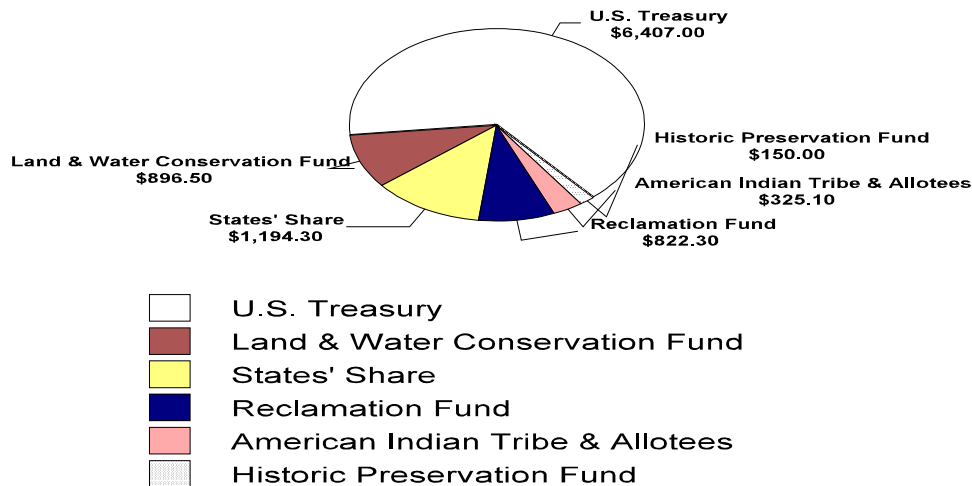
States receive a portion of federal OCS receipts derived from drainage tracts under section 8(g)¹⁹ of the OCSLA amendments of 1985. Section 8(g) was defined

¹⁸ *Protecting Natural Resources and Managing Growth: Issues in the 107th Congress*, Jeff Zinn, CRS Issue Brief IB10015, Updated October 1, 2001.

¹⁹ The 8(g) revenue stream is the result of a 1978 OCSLA amendment that provides for a “fair and equitable” sharing of revenues from 8(g) common pool lands. These lands are defined in the amendments as submerged acreage lying outside the 3-nautical mile state-federal demarcation line, typically extending to a total of 6 nautical miles offshore but
(continued...)

in the 1978 OCSLA amendments but a dispute over what was meant by a “fair and equitable” division of receipts was not settled until 1985 with the enactment of P.L. 99-272. Payments to the states were placed in escrow, then paid out to the states between 1986 and 2001.²⁰ For onshore public domain leases, states generally receive 50% of rents, bonuses and royalties collected. Alaska, however, receives 90% of all revenues collected on public domain leases.

Figure 2 Distribution of Revenue From Federal and Indian Leases, FY 2001
(million of dollars)



Source: Mineral Revenues 2001, MMS.

Deepwater Royalty Reductions

Legislative efforts to encourage offshore development include extending the Deepwater Royalty Relief Act of 1995 (DWRRA, P.L. 104-58). The Royalty Relief Extension Act of 2001, Section 6201 of the House-passed omnibus energy bill, H.R. 4 would extend for two years the original Deepwater Royalty Relief Act (DWRRA) which covered lease sales through November 2000. Provisions for deepwater royalty relief are not included in the Senate-passed energy bill.

Proponents argue that royalty reductions provide the incentives necessary to pursue technologies for deepwater oil and gas development. And further, they contend, these incentives are necessary to be competitive with foreign offshore prospects (e.g., Brazil and West Africa) and to enhance U.S. energy security. Opponents contend that deepwater technology has advanced enough to ensure the economic viability of deepwater reserves, thus there is no need for further royalty relief.

¹⁹ (...continued)

which include a pool of oil common to both federal and state jurisdiction. The states' share of the revenue (27%) was established by the OCSLA amendments of 1985 (P.L. 99-272).

²⁰ Mineral Revenues 2000, p. 95.

Under DWRRA, the Secretary of the Interior may reduce royalties if production would otherwise be uneconomic. A certain initial amount of oil and gas produced at specified depths is automatically exempt from royalty payments. The House-passed version of the energy bill (H.R. 4) would reduce the threshold production levels, under which no royalty would be applied.

Under the House bill, royalty suspension is granted on the initial production of each lease in barrels of oil equivalent (BOE) at the following offshore depths: 5 million barrels at 400-800 meters; 9 million barrels at 800-1,600 meters (see Table 3); and 12 million barrels at depths greater than 1,600 meters. Savings to the industry were estimated by the MMS to be \$17 million in bonuses and \$25 million in discounted royalties in water depths between 400-799 meters. The industry is estimated to save \$91 million in bonuses and \$338 million in discounted royalties in water depths between 800-1,599 meters.²¹

The MMS issued a final rule on February 23, 2001, which revises parts of the previous rule regarding royalty relief in the GOM and provides a framework for the issuance of leases after November 2000.²² The main feature of the new rule is that each lease could receive royalty reductions, versus reductions to each field in the original royal relief act. This would provide a greater financial incentive for drilling in deepwater than under the original act.

Table 3. Royalty Suspension Volumes Per Lease

1995 (P.L.104-58)		2001 (House Version of H.R. 4)	
Depth	Barrels of Oil Equivalent (in millions)	Depth	Barrels of Oil Equivalent
200-400 meters	17.5	–	–
400-800 meters	52.5	400-800 meters	5.0
> 800 meters	87.5	800-1,600 meters	9.0
–	–	>1,600 meters	12.0

Source: P.L.104-58 and H.R. 4, as passed by the House.

The Senate version of H.R. 4 would have required the Secretary of the Interior to evaluate the impact of tax and royalty policies on the development of domestic oil and gas. The Senate proposal contained a provision for greater R&D funding directed at developing technologies to extract methane hydrates in coastal waters, to explore and develop more of the oil and gas resources in ultra-deepwater Gulf of Mexico, and to mitigate environmental effects.

²¹ MMS Memo, November 2001.

²² Federal Register, vol. 66, no. 37, February 23, 2001, p. 11512.

The original 1995 DWRRRA was intended to encourage oil and gas development in deep water (depths of 200 meters or more) under conditions of low oil prices and high drilling costs. Since enactment, the number of leases in deepwater areas in the Gulf of Mexico has increased substantially along with deepwater production but increased production was not linked directly to the increased lease sales for the same period.

Development of offshore oil and gas has been considered essential to U.S. energy security strategy by the current and previous Administrations. Eliminating the royalty, set at 1/6 or 1/8 of the value of production (minus certain allowable costs), has saved the oil industry millions of dollars. Critics, during the House debate on H.R. 4 in the 107th Congress, charged that the government would forfeit millions of dollars through this subsidy and, further, that drilling costs were already coming down as a result of advances in technology, thus making many deepwater lease tracts economical. Proponents contended that without royalty relief, little deepwater drilling would take place and that therefore the relief represents no loss to the federal government. Additionally, proponents pointed out, the law states that any year the arithmetic average New York Mercantile Exchange (NYMEX) price reaches or exceeds \$28.00 per barrel for light sweet crude oil and \$3.50 per million British thermal units (Btu's) or thousand cubic feet (mcf) for natural gas, production would be subject to royalties at the established rate.

Since 1994, the average annual oil price has, on occasion, gone over \$28 per barrel, and gas prices rose to an average of \$3.86 per thousand cubic feet in 2000 and 2001. OCS oil and gas did not receive royalty relief during those years. However, between 1994 and 1999, prior to the recent runup, prices for oil and gas were relatively stable (see Table 4), between \$15-\$20 per barrel for oil and \$2.02-\$2.78 for natural gas.

Table 4. Oil and Gas Prices, 1994-2001

Year	Crude Oil Prices (dollars per barrel)	Natural Gas Prices (dollars per thousand cubic feet)	Offshore Footage Drilled
1994	15.59	2.28	124,809
1995	17.23	2.02	117,832
1996	20.71	2.69	129,045
1997	19.04	2.78	156,661
1998	12.52	2.40	147,335
1999	17.51	2.62	99,410
2000	28.26	4.38	139,949
2001	23.50	5.12	197,999

Source: *Monthly Energy Review*, Energy Information Administration, February 2002.

Typically, drilling activity would rise or fall with prices. Table 4 shows a falloff of offshore drilling in 1999 after a sharp downturn in oil prices in 1998. When prices

rebounded in 1999, drilling activity increased in 2000. The monthly average for drilling grew at a greater rate in 2000 as prices fluctuated between \$25-\$30 per barrel of oil. The modified royalty reduction schedule and high prices were sufficient incentives to encourage increased drilling.

As a result of the application of new technology, which has cut OCS oil and gas production costs,²³ and higher prices for oil and gas, new lease sales and production are expected to continue to rise. This is quite a different scenario for offshore oil and gas development than seven years ago. Deepwater drilling in the Gulf of Mexico has benefitted tremendously from improved technology, higher prices and royalty reductions. These current conditions have led to increased drilling in “ultra-deepwater” (over 1,600 meters deep).

Offshore Reserves and Resources²⁴

The MMS estimates that total proven reserves in the OCS are 3.8 billion barrels of oil and 31.3 trillion cubic feet of natural gas (see table 5). In the Gulf of Mexico, the MMS estimates oil and gas reserves in 880 proved OCS fields. Of this total, 815 are active and contain remaining reserves estimated at 3.0 billion barrels of oil (BBO) and 23.6 trillion cubic feet (tcf) of natural gas. An additional 2.4 billion barrels of oil and 9.7 trillion cubic feet of natural gas in unproved reserves are in the Gulf of Mexico.²⁵ The offshore proved oil reserve estimates accounted for 13% of all U.S. oil reserves and 15% of natural gas reserves in 2000, according to Energy Information Administration (EIA) data.

Oil and gas reserves in general fluctuate as a result of prices. When prices increase, reserve estimates rise also because more of the resource becomes economically recoverable. And when prices decline, so do reserves. The EIA measures changes in oil reserves annually by the percentage of U.S. crude oil production replaced. In 2000, reserve additions replaced 115% of U.S. oil production. Reserves, overall, were added to the OCS while reserves declined in Texas, California and Alaska. Louisiana accounts for most of both oil and natural gas

²³ Deepwater Gulf of Mexico: America’s Emerging Frontier, OCS Report MMS 2000-022, U.S. Department of the Interior, p. ix., April 2000.

²⁴ Oil and gas reserves are defined by the MMS as hydrocarbon resources that have been discovered and may be commercially recoverable under reasonably foreseeable economic scenarios. Reserves are further classified as proven and unproved. Unproved reserves are estimated hydrocarbons that are potentially recoverable from known reservoirs. Resources are typically undiscovered hydrocarbons estimated on the basis of geologic knowledge and theory to exist outside of known accumulations. These resources can exist in prospects or in known fields (undrilled reservoirs). Undiscovered conventionally recoverable resources are those resources producible with current technology without consideration of economic viability.

²⁵ U.S. DOI, MMS OCS Petroleum Assessment, 2000.

reserves offshore, about 75% of each. Louisiana's reserve replacement was about 7% in 2000.²⁶

The Gulf of Mexico (GOM) is cited by the EIA as the most promising region for new additions to U.S. oil reserves because it led the nation in total discoveries with 423 million barrels in 1999 (despite its net loss of reserves)²⁷ and 702 million barrels in 2000. The MMS 2002-2007 5-Year Program also lists the GOM as the most promising area.

In addition to the remaining proved and unproved reserves, the proposed 5-year planning area is estimated to contain significant quantities of economically recoverable resources (see table 6). The estimates are based on low and high price scenarios for oil and gas. Low price estimates are \$18/barrel for oil and \$2.11/mcf for natural gas and the high price estimates are \$30/barrel and \$3.52/mcf. The Central Gulf contains an estimated 4.16-7.14 billion barrels of unleased economically recoverable oil resources and between 21.2-32.0 trillion cubic feet of unleased natural gas. The Western Gulf estimates of economically recoverable unleased oil and gas resources are between 2.8-4.5 BBO and 16.2-23.7 tcf respectively.²⁸ Taken together these two areas account for 68% of the total 5-Year Lease Plan under the low and high price scenarios. The region contains over 90% of the program area's natural gas under low and high price scenarios. Eastern Gulf estimates in the proposed plan contain 0.12-0.29 BBO while Alaska contains an estimated 3.1 BBO - 9.5 BBO of unleased economically recoverable oil resources.

Table 5. Offshore Oil and Natural Gas Reserve Estimates, 1999

	Oil (BBO)	Natural Gas (tcf)
Proved Reserves	3.8	31.3
Unproved Reserves	2.4	9.7

Source: OCS Report, MMS 2002-007

Many more discoveries are expected in current deepwater "plays"²⁹ that were identified in the 1980's and 1990's. Because of the time needed for development, the large discoveries that were made in the late 1990's are on leases purchased in the

²⁶ MMS, Mineral Revenues, 2000.

²⁷ See footnote 2.

²⁸ U.S. Department of the Interior, MMS, OCS Report MMS 2001-088, Economic Analysis for the OCS 5-Year Program 2002-2007: Theory and Methodology.

²⁹ "A play is a set of discovered or undiscovered oil and gas accumulations or prospects that exhibit nearly identical geological characteristics. A play is defined therefore, by the geological properties (such as trapping style, types of reservoir, nature of seal) that are responsible for the accumulations or prospects." (energy.usgs.gov/factsheets/NOAGA/oilgas.html).

1980's. The lease sales that were conducted in the 1996-99 period are likely to have a major impact on offshore reserves over the next 5-10 years.³⁰

Within the context of world oil and gas reserves and resources the GOM represents significant supplies for the United States in the short and long run. According to some estimates, world proven oil reserves are just over a trillion barrels (1.1 trillion) and gas reserves are estimated at 5,146 trillion cubic feet.³¹ In total, the U.S. holds about 3% of the proven oil (21.8 BBO) and natural gas (164 tcf) reserves in the world. Additional U.S. offshore resources of 75 billion barrels of oil and 362 tcf of gas offshore can be added when including the category of undiscovered conventionally recoverable resources estimated by the MMS. These estimates, if correct would yield significant oil and gas in the long run, and would enhance U.S. energy security. The Bush Administration initially wanted to conduct a detailed study of the OCS areas now off-limits to exploration to assess their resource potential but reportedly has recently reversed its position and will not pursue any study of those areas.³² Offshore areas currently withdrawn or under moratoria³³ contain an estimated 16 billion barrels of undiscovered recoverable oil and 62 tcf of natural gas according the U.S. Geological Survey.

Table 6. Economically Recoverable Resources in Proposed MMS 5-Year Planning Area

	Oil (BBO)	Natural Gas (tcf)
Central Gulf	4.17-7.14	21.2-32.0
Western Gulf	2.8-4.5	16.2-23.7
Eastern Gulf	0.12-0.29	0.50-1.16
Alaska	3.1-9.5	2.18-3.88

Source: OCS Report, MMS 2001-088

Offshore Oil and Gas Production

Over the past 10 years, oil production from the OCS has risen from 316 million barrels (1991) to 568 million barrels (2000) while natural gas has remained relatively constant between 4.5 tcf - 5.0 tcf over the same period³⁴ (see Table 1). Overall, out of about 3.0 billion barrels of oil produced in the United States in 2000, offshore oil,

³⁰ Gulf of Mexico Deepwater Future, *Oil and Gas Journal*, November 6, 2000, p. 74.

³¹ Data presented by the American Petroleum Institute in *Fortune Magazine*, 11/12/01, p. 84.

³² Inside Energy/Federal Lands Newsletter, October 29, 2001, p.13.

³³ The moratoria cover new leases off the Atlantic and Pacific coasts and a portion of the Eastern Gulf of Mexico (see figure1).

³⁴ MMS Revenues, 2000, p. 47.

accounted for 19% of production, up from 16.5% in 1999.³⁵ The OCS is now the largest producing area in the United States.

About 98% of all federal OCS leases are in the Gulf of Mexico. Offshore Louisiana accounts for 78% of OCS gas production and 90% of OCS oil production. Texas is a distant second in OCS gas production at 18% and California second in offshore oil production at 6% (see Table 7).

Table 7. Federal Offshore Oil and Gas Production, 2001

State	Oil (million barrels)	Gas (in billion cubic feet)
Alabama	.026	95
Alaska	0	0
California	34.8	40.4
Gulf of Mexico	17.1	122.8
Louisiana	502.6	3,717.0
Texas	16.4	640.9
Mississippi	–	24.6
Total	571.0	4,640.8

Source: Mineral Revenues 2001, MMS.

Deepwater

In recent years there has been tremendous interest in deepwater production in the GOM. Gulf of Mexico oil production reached 531 million barrels in 2000, over half of which was from GOM deepwater reserves³⁶ (see table 8). Between 1996-99 the MMS issued 2,600 leases in water at depths greater than 800 meters.

Deepwater production is expected to increase considerably over the next 10-15 years because most of the more recent leases have yet to be explored and developed; there is a lag of several years between the time of a lease sale and the time of development and production. Despite this lag, oil production from deepwater fields more than doubled from 1997 to 1999 (see table 8). Natural gas production from deepwater reserves also more than doubled over the same period³⁷ while gas

³⁵ *World Energy*, vol. 1, Standard and Poor's, p. 64, Spring/Summer 2000, and MMS 2000.

³⁶ Deepwater is generally defined by the MMS as water depths greater than 1,000 feet.

³⁷ Deepwater Gulf of Mexico, MMS. p 4.

production in shallower water declined by 17%. By 2000, natural gas from deepwater was about 20% of total GOM federal natural gas production.

Deepwater lease sales are increasing generally because of industry interest generated in large part by deepwater royalty relief and the rising value of deposits. The increase in value is the result of several factors that reduce production risk: thick reservoir sections, high production rates, improved deepwater technology, and the establishment of production infrastructure.

The average successful bonus bid per deepwater tract between 1994 -1999 rose substantially, particularly in water depths over 800 meters. Winning bonus bids overall, however, grew to \$1.4 billion in 1997 then fell off to \$249 million in 1999 but have since risen to \$632 million in 2001 (see Table 2).

Offshore drilling has fluctuated from 118 million feet in 1995 to 144 million feet in 2000. Drilling in ultra-deepwater, water more than 5,000 feet deep, has increased substantially in recent years. There were 24 wells drilled in water over 5,000 feet deep, including 2 over 7,000 feet deep, from 1995-98. There were 41 ultra-deepwater wells drilled, including 10 in water over 7,000 feet deep, from 1999-2000.³⁸

Table 8. Deepwater Production, 1994-2000

Year	Oil (million barrels)	Gas (billion cubic feet)	% of total Gulf of Mexico OCS Production	
			Oil	Gas
1994	41.8	159.5	13.3	3.3
1995	55.2	181.1	16.0	3.8
1996	72.2	278.2	19.57	5.5
1997	108.5	381.8	26.36	7.4
1998	159.2	560.5	35.84	11.1
1999	225.1	845.6	45.43	16.7
2000	271.1	998.8	52.0	20.2

Source: MMS, 2001.

Because of the potential of deepwater development and recent shallower water depletions, a number of the major international oil companies, including Chevron, Exxon Mobil, BP, and Shell, are heavily involved in offshore plays in the Gulf of

³⁸ *Oil and Gas Journal*, November 6, 2000, p. 82.

Mexico, Brazil and West Africa. These areas, taken together, are known as the “golden triangle” in the industry. These three regions are considered by the industry as a major growth area for investment. (For more on worldwide offshore resources, see Appendix). However, the success of deepwater operations is contingent on several factors, including fleet availability, rig performance, competent engineers, and the ability to resolve technical problems.

Offshore Technology

Exploring for offshore oil and gas has changed over the past several years. New technology has led to greater exploration and development into deep and ultra-deep water. Advances in high-quality 3-dimensional seismic surveying and processing, new drilling technology, and new drilling rigs allow for increased drilling at greater depths. The new rigs drill wells faster and more efficiently, resulting in achieving production more rapidly and lower-cost production. This increased speed has led to much shorter development time. Average development time has been reduced in the GOM from 10 years in 1984 to 2 years in 1996.³⁹

Offshore development projects are using floating structures, tension leg platforms, subsea installations with tie-backs to shallow water or land-based facilities. The floating production, storing, offloading vessels (FPSO's) can move to a new field once the existing field is depleted. The FPSO's are considered by the industry to be a lower cost alternative to pipelines. The FPSO, used in foreign waters, underwent an environmental review by the MMS for use in the GOM. It was approved in April 2002. Tension leg platform (TLP) designs, sensitive to a number of environmental factors such as water depth and current, are considered uneconomic in water over 5,000 feet. The TLP's consist of a floating structure connected to the sea floor by tensioned tendons used in water depths at up to 6,000 feet. However, composite-made TLP's may be used in depths of 10,000 feet. Subsea systems are generally applied to water depths at below 7,000 feet. The subsea completion system is tied back through a flowline to a shallow water platform.⁴⁰

Deepwater technology, among other factors mentioned above, has cut significant time and costs off development and will likely lead to much greater exploitation of deepwater reserves. However, there are several limiting factors, such as the limited life of the existing vessel or rig fleets, which are not suited for deepwater and subsea operations, and high capital costs. Deepwater facilities may cost over \$1 billion to construct, according to recent data from Noland Consultants, an oil and gas consulting firm. Noland Consultants forecast that between 2000-2005 \$76 billion will be spent on deepwater development projects in the Gulf of Mexico, the Gulf of Guinea and off the coast of Brazil.⁴¹

³⁹ Offshore Petroleum Operations, *Oil and Gas Journal*, April 30, 2001, pp. 75-76.

⁴⁰ International Petroleum Encyclopedia, 2001, p. 210.

⁴¹ Noland Consultants, International Petroleum Encyclopedia, 2001, p. 209.

Appendix: World Deepwater Potential

Worldwide, deepwater offshore oil potential appears even more promising than the GOM. In 1999, the GOM ranked third (2.9 BBO) behind Brazil (3.8 BBO) and West Africa (at 8.6 BBO) out of a projected total of 19.4 BBO of deepwater resource potential. This deepwater reserve base represents about 79% of all offshore deepwater oil reserves in the world⁴² (see figures 3 and 4). Deepwater gas represented only 7.5% of all offshore natural gas. Deepwater reserves, overall, make-up about 14% of world offshore oil reserves. West Africa leads the world for deepwater potential.

Increased drilling and an increasing number of new ultra-deep fields are being located offshore Brazil and on the West coast of Africa. Estimated deepwater and ultra-deepwater shares of reserves proposed for development break out as follows: West Africa-32%, Brazil-27% and Gulf of Mexico-27%. However, production from West Africa and Brazil is relatively low.⁴³ West Africa is expected to account for nearly 7% of offshore oil production in 2005, up from 5.5% in 1990, while all of Central and South America would contribute only 4.8% of total offshore oil production in 2005. In West Africa, there are 38 existing offshore operational projects at a mean water depth of 132 meters, but that number is expected to rise to 342 by 2007 at a mean water depth of 919 meters.⁴⁴

One of the major differences between the GOM and offshore West Africa is that the GOM has been explored more and today its stand-alone prospects are much smaller (80 million barrels) than Brazil (400 million barrels) and West Africa (500 million barrels). However, the GOM deepwater region in general terms, is a relatively immature basin in a very mature area.

Worldwide, shallow water reserves still dominate fields on-stream; U.S. shallow water GOM oil reserves are measured at 133 million barrels. The top three areas for shallow water reserves are the Asia-Pacific (7.2 BBO), West Africa (4.9 BBO) and the U.K. (4.0 BBO). Asia-Pacific is known to have the largest shallow water natural gas reserves, at 170 tcf.⁴⁵

In terms of world oil and gas reserves, onshore reserves still dwarf offshore reserves, but when it comes to finding new oil and gas reserves, deepwater offshore will likely become the frontier development area.

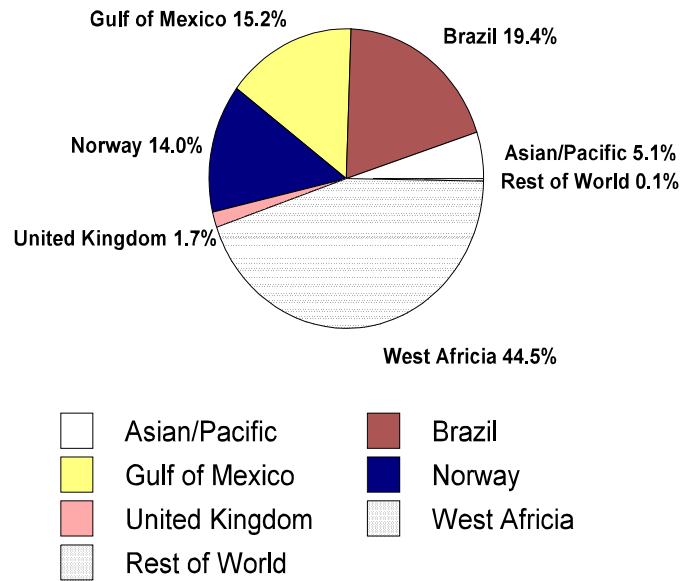
⁴² Long Term Prospects Very Bright For Deep Waters Off West Africa, Roger Knight and John Westwood, *Oil and Gas Journal*, January 18, 1999, p. 34

⁴³ The estimates were provided in the World Deepwater Report by Douglas-Westwood Associates, referenced in the *Oil and Gas Journal*, April. 30, 2001, p. 73.

⁴⁴ *Oil and Gas Journal*, January 18, 1999, p. 36.

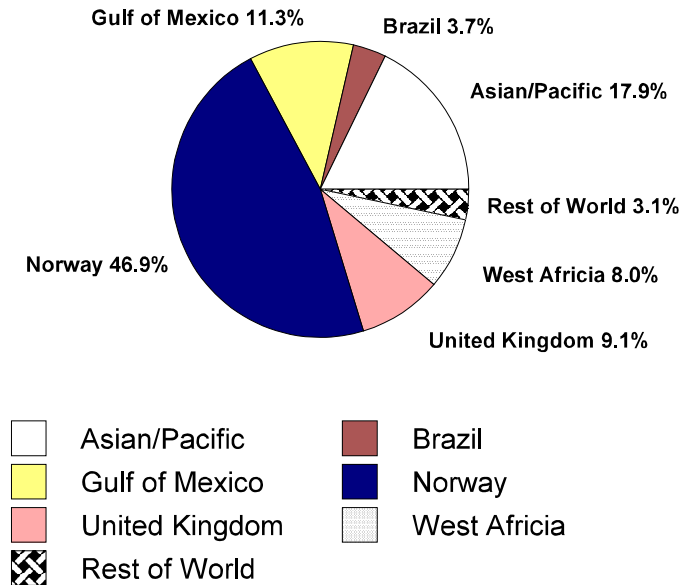
⁴⁵ See Table 6 for a selected comparison of deep and shallow water oil and gas reserves measured in tons of oil equivalent.

Figure 3. Deepwater Oil Reserves, 1999-2007



Source: *Oil and Gas Journal*, 1/18/99.

Figure 4. Deepwater Gas Reserves, 1999-2007



Source: *Oil and Gas Journal*, 1/18/99.

**Table 9. Deepwater vs Shallow Water Oil and Gas Reserves,
1999-2007**

(tons of oil equivalent (TOE))

Region	Deepwater	Shallow Water
Asia/Pacific	340	4,956
Brazil	547	76
Gulf of Mexico	505	75
Norway	911	789
United Kingdom	150	1,025
West Africa	1,246	965
Rest of World	38	14,515
World Total	3,737	22,401

Source: *Oil and Gas Journal*, 1/18/00.