

Update:

**Analysis of Government Estimates of Lease Bonus Bid Revenue from
Proposed Leasing on the Arctic National Wildlife Refuge Coastal Plain**

Prepared for the Alaska Wilderness League

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Synopsis

Government agency estimates of revenue from leasing of the Coastal Plain of the Arctic National Wildlife Refuge for petroleum exploration and development may be illusory.

The Congressional Budget Office (CBO) and the Administration have estimated that oil companies will bid, on average, \$10,000.00 to \$11,667.00 per leased acre to purchase drilling and exploration rights on the Arctic Refuge Coastal Plain. These government projections stand in extreme contrast to the reality of lease bonus sales on Alaska's North Slope (ANS) and its near-shore waters (ANS). Since 1991, ANS petroleum lease sales have brought in an average of just \$51.11 per leased acre. Despite recent high oil prices, in five ANS sales during 2006 the average bonus bid payment dropped to \$27.97 per leased acre (all figures in nominal dollars).

A comparison between ANS petroleum lease bidding and the Gulf of Mexico (GOM) shows a generally similar trend. Although recent major oil discoveries and successful development in the GOM have raised lease bonus bid payments there, increased 2006 GOM average bids of \$286.00 per leased acre still fall far short of the amounts predicted by CBO and the Administration from leasing on the Arctic Refuge Coastal Plain.

Report Figures 1 and 2 graphically portray the results of this analysis. These figures are based on acreage leased and amounts paid in nearly 200 ANS and GOM lease sales since 1961. The raw lease bonus data are listed in Appendix Figures A1 and A2 and summarized in Appendix Figures A3 through A5. The updated data confirm previous concerns and raise new questions regarding the extraordinary disparities between the optimistic government agency projections for the Arctic Refuge Coastal Plain and actual leasing results in the nation's two major petroleum provinces.

Following presentation of the tabulated ANS and GOM lease bonus bid data, this report discusses the vast difference between agency estimates of potential revenue from leasing on the Arctic Refuge Coastal Plain and the much lower ANS and GOM lease bonus payment levels that have prevailed for more than two decades. Review of industry reports on lease bonus bidding suggests that the relatively low ANS and GOM lease bonus bid payments experienced during the last quarter century may result in part from increasing industry recognition that lease bonus bidding is a form of high-stakes gambling that seldom pays off. The distinction between proved reserves that can be readily developed and undiscovered and unproven reserves estimated to lie beneath an unexplored area is central to this analysis. Because uncertainty reduces the value of an asset, lease bonus bids for unproven acreage are liable to be much lower than cash payments to purchase discovered reserves.

Alaska North Slope Lease Sale History

This analysis updates the author's January 2005 report on the extreme contrast between Alaska North Slope lease bonus bidding practices and government agency estimates of the revenue that would be generated in lease bonus bids for exploration and production rights on the Arctic Refuge Coastal Plain.¹ An earlier version of this update (dated Nov. 15, 2006) has been revised in response to information provided by Congressional Budget Office (CBO) staff in a Dec. 8, 2006 meeting; graphics, data and general conclusions are unchanged from the Nov. 15 version.

The President's FY 2007 budget proposal counted \$7.0 billion in revenue from lease bonus bids for petroleum exploration and production rights on the Coastal Plain of the Arctic National Wildlife Refuge, anticipated in FY 2008, plus \$1.0 billion from a follow-up lease sale in FY 2010.² The Congressional Budget Office (CBO) estimated Arctic Refuge leasing would generate \$6.0 billion in lease bonus revenues. The revenue from these lease sales would be split between the federal government and the state of Alaska on a 50-50 basis.³

If 600,000 acres were available for leasing in the first Arctic Refuge lease sale,⁴ to achieve the Administration lease bonus revenue estimate, each and every acre would have to be leased for an average price, in nominal dollars, of \$11,667.00 per leased acre.⁵ To generate the CBO figure, each leased acre would have to bring in an average of \$10,000.00 per acre.

These government projections stand in extreme contrast to the reality of lease bonus sales on Alaska's North Slope and its near-shore waters (ANS) since 1991. During this period, 45 separate sales have averaged just \$51.11 per leased acre. Despite recent high oil prices, in five ANS sales during 2006 the average bonus bid payment dropped to \$27.97 per leased acre. The 2006 ANS lease bonus bid average represents a decline from both the 1991-2005 and the 2001-2005 averages.⁶

In Figure 1 on the following page, nominal dollar ANS lease bonus bid results are converted to real (inflation-adjusted) dollars using the gross domestic product (GDP) chained price deflator. When converted to real dollars, the 1991-2006 ANS average is \$58.42 per leased acre; a similar conversion would reduce the agency lease bonus estimates for 2008 to approximately \$11,054.00 per leased acre (President's FY 2007 budget proposal) and \$9,565.00 per leased acre (CBO).⁷

¹ Richard A. Fineberg, [Projected Bonus Payments from Proposed Leasing On the Arctic National Wildlife Refuge Coastal Plain Greatly Exceed North Slope Historical Trends](#), Alaska Wilderness League, Jan. 15, 2005.

² *Budget of the United States Government, Fiscal Year 2007*, "Summary Tables," p. 318 (accessed May 30, 2006 at <http://www.whitehouse.gov/omb/budget/fy2007/pdf/budget/tables.pdf>).

³ *An Analysis of the President's Budgetary Proposals for Fiscal Year 2007*, March 2006, p. 15 (accessed May 30, 2006 at <http://www.cbo.gov/ftpdocs/70xx/doc7069/03-14-PresidentsBudget.pdf>).

⁴ Although drilling proposals considered in 2005 required that the first sale offer a minimum of 200,000 acres, previous Administration budget proposals called for leasing 400,000 to 600,000 acres in the first sale (see, for example, *Budget of the United States Government for Fiscal Year 2004*, General Provisions, p. 603).

⁵ \$7.0 billion / 600,000 = \$11,667.00 per leased acre.

⁶ For a list of Alaska North Slope leases sale since 1961 and amounts paid in bonus bids, see Appendix Figure A1; periodic averages are shown in Appendix Figures A3 - A5. (To align with budget documents and permit direct linkage to the lease bonus data presented in the appendices, these summary data are expressed in nominal dollars.)

⁷ Nominal dollars are converted to inflation-adjusted 2006 \$ using the GDP chained price deflator reported in the President's FY 2007 budget (*Budget for Fiscal Year 2007*, Historical Tables, "Gross Domestic Product: and Deflators," pp. 192-193 [released 2/6/06; 2006-2008 estimated]).

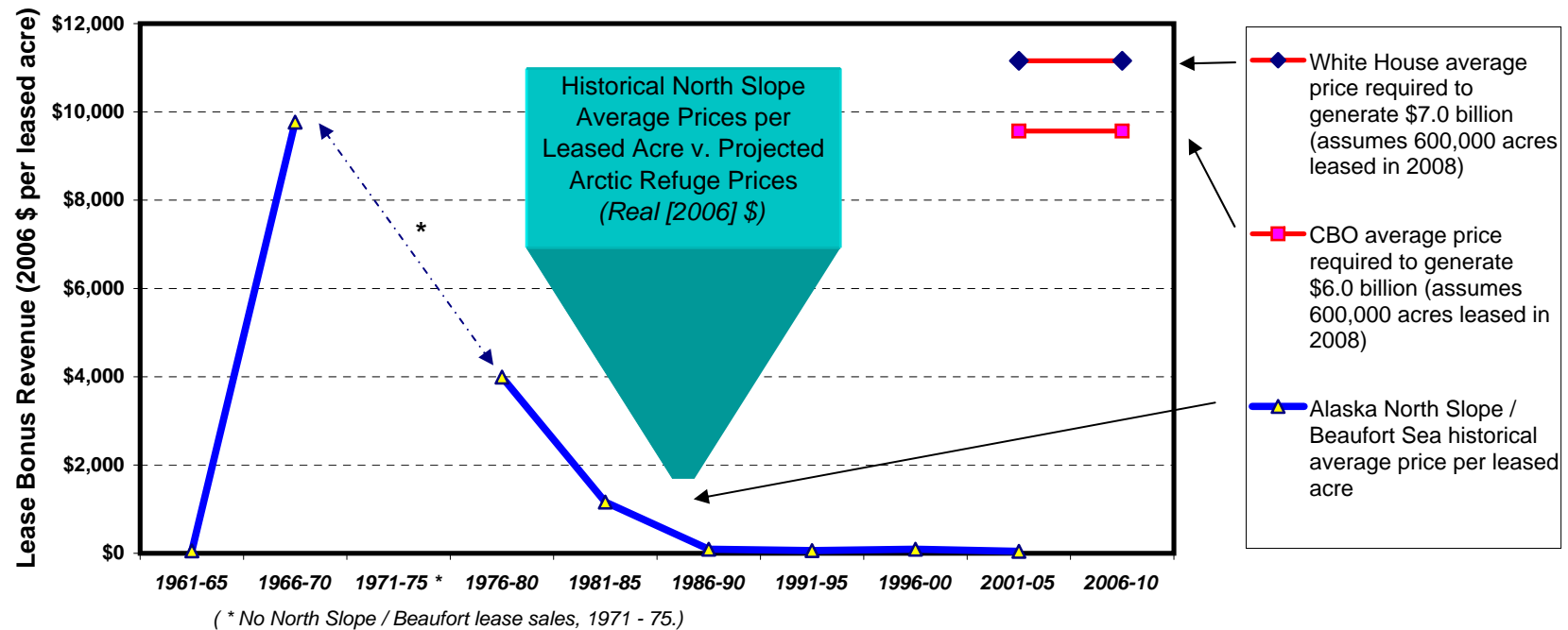
Figure 1.

Alaska North Slope Petroleum Lease Revenues, 1961 - 2006

There is a significant disparity between the low Alaska North Slope bonus bids in lease sales since 1991 (blue line on chart, showing five-year average payments per leased acre) and the amounts that the Administration and CBO believe oil companies would pay for exploration and production rights on the Arctic Refuge Coastal Plain (red bars at top right).

Agency estimates that Arctic Refuge leasing might contribute \$3.0 to \$3.5 billion to federal deficit reduction (the federal half of lease bonus revenues) ignore factors that caused the steep decline in North Slope bidding during the 1980s, as well as the subsequent pattern of significantly reduced lease bonus bids on the North Slope and elsewhere (see Richard A. Fineberg, *Projected Bonus Payments from Proposed Leasing on the Arctic National Wildlife Refuge Coastal Plain Greatly Exceed North Slope Historical Trend*, Jan. 2005, at <http://www.finebergresearch.com>).

Despite high oil prices during 2006, the trend of declining per-acre lease bonus payments on the North Slope continued in five North Slope lease bonus sales.



As shown in Figure 1 and discussed in the author's 2005 report, high North Slope lease bonus bid payments followed the 1967 discovery of Prudhoe Bay, the nation's largest oil field. The high-water mark for ANS bidding was the infamous Mukluk sale in October 1982. Identified by the U.S. Minerals Management Service and other observers as the most expensive dry hole in history, that sale generated average lease bonus bids of \$3,101.00 per acre (nominal \$) but resulted in no oil discovery.⁸

The Mukluk failure occurred near the start of the steep decline in ANS lease bonus bids shown in the preceding figures. That decline ushered in the extended period of significantly reduced lease bonus payments that continues today. In the last 24 years, no North Slope lease sale has come close to replicating the results of the Mukluk sale.⁹

Gulf of Mexico Comparison

Figure 2 compares the ANS lease bonus bidding patterns for the last 45 years to the corresponding data from the region that boasts this nation's other major petroleum development hot spot, the Gulf of Mexico (GOM). This figure shows the general congruence between ANS and GOM lease sale results during the last two decades. In a pattern similar to that of the North Slope, GOM lease sale revenues peaked with skyrocketing oil prices during the 1970s, then plummeted during the 1980s and never returned to pre-decline levels. The significance of these parallel histories (and their recent divergence) will be discussed below.

In Figure 2, the data are displayed in nominal dollars so that the five-year averages shown for both regions can be drawn directly from the lease sale data presented in Figures A1 through A5. The use of nominal dollars establishes a direct linkage to raw lease bonus sale data and enables the reader to see more clearly the general congruence between ANS and GOM lease sale results during the last two decades.¹⁰ The updated data suggest a recent divergence between ANS and GOM lease bonus bid results, which will be discussed in the next section. In this chart, the reduced agency estimates of potential Arctic Refuge lease bonus bid revenues (again shown in the upper right-hand corner) reflect the assumption that each and every acre of the Arctic Refuge Coastal Plain would be leased.¹¹ This unlikely assumption would result in average per-acre Arctic Refuge lease bonus bids of \$4,000.00 per leased acre.¹² If more probable, lower assumptions of leased acreage used in Figure 1 were used in Figure 2, to generate agency estimates of lease bonus bid revenues from the Arctic Refuge Coastal Plain, the result higher average lease bonus bid payments per acre would be off the chart.

⁸ U.S. Bureau of Land Management, *Northeast National Petroleum Reserve – Alaska, Final Integrated Activity Plan / Environmental Impact Statement*, "III. Description of Affected Environment; (2) Petroleum Geology," 1998 (accessed circa January 2005 at <http://aurora.ak.blm.gov/npra/final/html/3a1a2.html>); National Research Council Committee on the Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope, *Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope*, National Academies Press, 2003, p. 182; and Yereth Rosen, "Expanded Offshore Alaska Oil Drilling?" (Reuters), Sept. 15, 2003 (accessed Nov. 8, 2006 at <http://www.planetark.com.au/dailynewsstory.cfm/newsid/22227/story.htm>).

⁹ For background and additional discussion of the decline in ANS lease bonus bids during the 1980s, see *Projected Bonus Payments from Proposed Leasing On the Arctic National Wildlife Refuge Coastal Plain Greatly Exceed North Slope Historical Trends*, pp. 3-4 and 6-14.

¹⁰ Some have argued that Figure 2 should be presented in real dollars so that the reader can compare the results of the 1982 Mukluk sale to agency forecasts for the Arctic Refuge. It is the author's view that the failure of the Mukluk sale contributed to the significantly lower lease bonus bidding rates that have prevailed over the last quarter century and that the Mukluk results are unlikely to be achieved in the future. For these reasons, the Mukluk comparison has little relevance to this report.

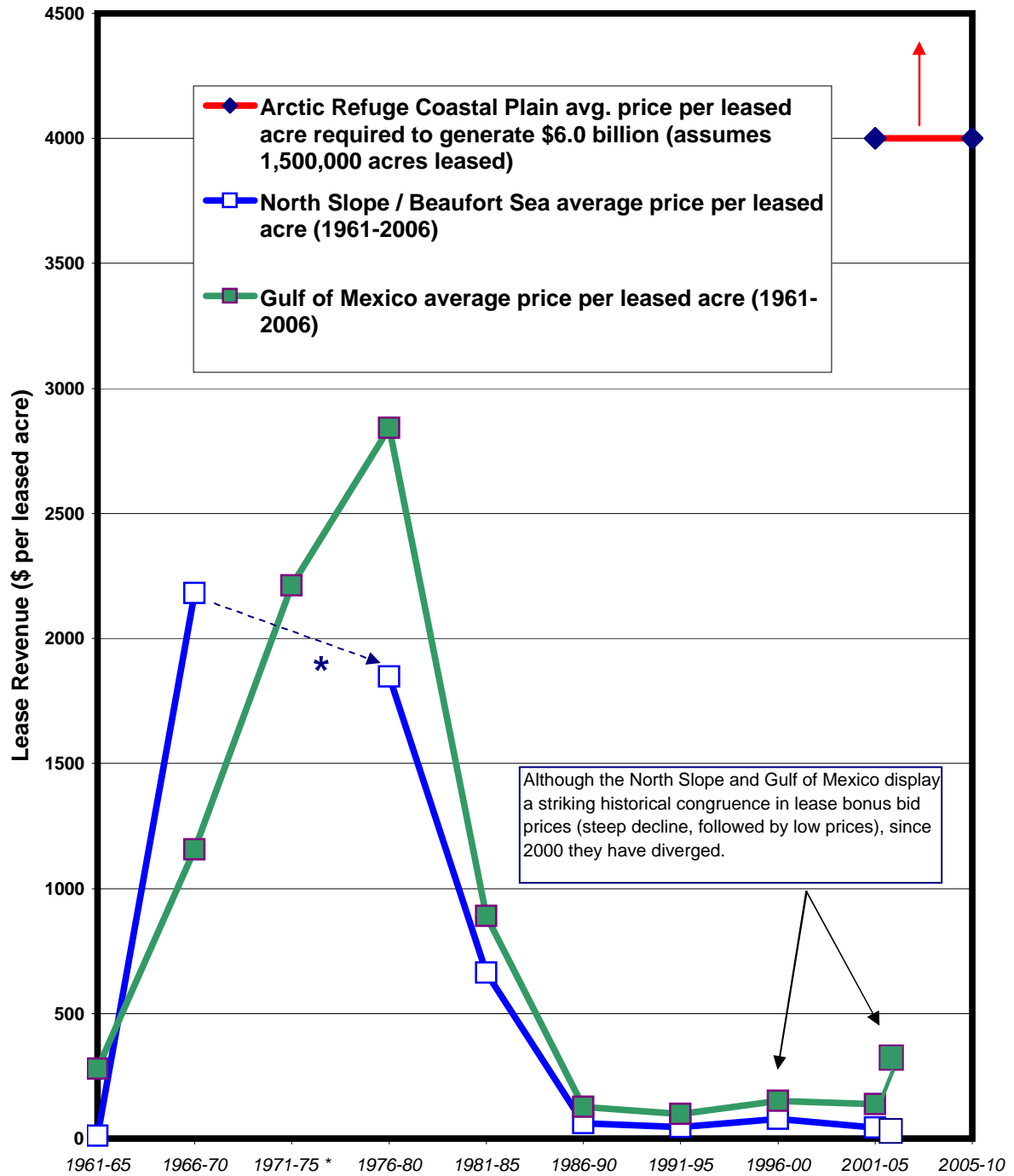
¹¹ Empirical data do not support the notion that the industry would bid on every acre of the entire Arctic Refuge Coastal Plain. In the 1982 Mukluk sale, for example, approximately 36% of the acreage offered for sale was actually leased (see appendix Figure A1).

¹² 1,500,000 acres x \$4,000.00 = \$6,000,000,000.00.

Figure 2.

Alaska v. Gulf of Mexico Lease Revenues, 1961 - 2006

(Nominal Dollars)



* No North Slope / Beaufort lease sales between 1971 and 1975.

(Source: Appendix Figures A1 - A5.)

As shown in Figure 2, during the 1990s, ANS lease bonus bid payment trends paralleled GOM lease bonus payments, but ANS sales generally brought in lower revenues. Since 2000, ANS lease bonus bid results have diverged from GOM results. In the 2006 GOM lease sale, lease bonus bid payments averaged \$286.23 per leased acre, doubling 1996-2000 rates.¹³ The GOM increase was caused by a number of factors, including the following:

- major new GOM discoveries;
- the prospect of increasing future global oil demand pressures; and
- elevated current and forecast oil prices.

Similar factors might have been expected to augment recent ANS results, but they didn't. As noted above, in 2006 ANS lease bonus payments continued on a generally declining trend that has prevailed for more than a decade, with five lease sales fetching an average of \$27.97 per leased acre.¹⁴ This divergence raises the possibility that ANS leases may be less responsive than leases in other regions to factors that tend to increase lease bonus bid offerings.

Discussion

The author's January 2005 report presented data showing that CBO and OMB estimates of lease bonus bid revenues from the Arctic Refuge Coastal Plain were much higher than the ANS or GOM lease bonus bid payments during the last two decades. That report also noted the dramatic reduction in ANS lease bonus bids during the last two decades and the congruence between ANS and GOM bidding patterns. Based on these findings, the 2005 report concluded:

Before counting on multi-billion-dollar lease bonus revenues from the Arctic Refuge Coastal Plain, policy makers should seek cogent explanations for the extreme difference between government estimates of bonus bid revenues and the well-established historical pattern of much lower lease bonus revenues from Alaska's North Slope. To the extent that estimates of lease bonus payments from the Arctic Refuge Coastal Plain are derived from economic models, policy makers should examine carefully the inputs and the methodology of the model or models employed in those estimates.¹⁵

Citing the author's 2005 report, in February 2005 a bipartisan group of ten senators asked CBO to explain its estimates of Arctic Refuge lease bonus payments. CBO responded with a general discussion of factors the agency's model considered. The key variables listed by CBO included rising oil prices, the resulting revenue that would be generated from production of the U.S. Geological Survey (USGS) mean estimate of undiscovered petroleum beneath the Arctic Refuge Coastal Plain, development costs and discounted cash flows. In that letter, CBO said its estimate "relies on the mean of the USGS ranges." But the agency also acknowledged that lease bonus bid estimates "are particularly uncertain because firms can vary significantly in their assessment of the geologic prospects, future market conditions, and the strategic value of the

¹³ See Appendix, Figures A2 and A5.

¹⁴ See Appendix Figures A1 and A3 – A5.

¹⁵ *Projected Bonus Payments from Proposed Leasing On the Arctic National Wildlife Refuge Coastal Plain Greatly Exceed North Slope Historical Trends*, p. 17.

project to their company.” In view of that uncertainty, CBO said, “the winning bids . . . could range from about \$2 billion to about \$8 billion, depending on the assumptions made.”¹⁶

In addition to the uncertainty inherent in estimating the amount of oil that may (or may not) exist in a given petroleum reservoir or province noted by CBO, the term “reserves” adds confusion to the mix. The Society of Petroleum Engineers (SPE) defines reserves as “those quantities of petroleum which are anticipated to be commercially recovered from known accumulations from a given date forward.” SPE divides reserves into categories to denote the degree of uncertainty in a particular reserve estimate. The first dividing line is between “proved” and “unproved” reserves. According to the SPE, “Unproved reserves are less certain to be recovered than proved reserves and may be further sub-classified as probable and possible reserves to denote progressively increasing uncertainty in their recoverability.”¹⁷ All other things being equal, reserves increase in value as their certainty increases. One expert’s depiction of the value of different reserve classes suggests that unproven and undiscovered reserves in an unexplored prospect are worth about six times less per barrel than known reserves in a producing field.¹⁸

CBO offered three principal arguments to support its 2005 estimate that leasing on the Arctic Refuge Coastal Plain would generate \$5.0 billion in lease bonus bids:

- to produce low-end results, all bidders would have to make pessimistic assumptions regarding prices and risks, but any single bidder making optimistic assumptions would result in high-end lease bonus payments;
- between 1969 and 1984, “companies paid approximately \$11 billion (in 2005 dollars) for reserves in the North Slope region that were estimated to total about 10 to 12 billion barrels of oil;” and
- subsequent low Alaska lease bonus bids reflect “lower expectations regarding the size of likely reserves in other areas being offered.”¹⁹

The CBO responses appear to be somewhat detached from empirical realities. The following paragraphs discuss each of the three CBO responses:

- CBO’s first argument accurately describes factors that may elevate lease bonus bids. But it is widely recognized that the same factors may cause significant overbidding. The term “winner’s curse” is used to describe the role excessive lease bonus bids can play in driving exploration costs up by securing acreage that does not hold oil or contains deposits that do not pan out economically. After decades assigning values to prospective acreage for a major oil company, the creator of that term concluded that “[i]f everyone lowered their bids to protect from the [winner’s] curse, then the entire industry would be better off.”²⁰ A similar point is made by industry analyst Daniel Johnston, who

¹⁶ Letter from Douglas Holtz-Eakin to Senator Russell Feingold (and nine colleagues), March 14, 2005 (<http://www.finebergresearch.com/pdf/cc-anwr-Feingold.pdf>), pp. 1, 3. At that time, CBO’s budget estimate was \$5.0 billion, which the agency described as “in the middle of that [\$2.0 to \$8.0 billion] range.” (In 2006, CBO increased its estimate to \$6.0 billion. The agency’s Dec. 7, 2006 letter to Senator Ted Stevens, which stated that, “[u]nder your assumptions, potential bonus bids might total at least \$10 billion,” reflected a scenario dictated by the senator, not a revised agency estimate.)

¹⁷ Society of Petroleum Engineers, 1997 (http://www.spe.org/spe/jsp/basic_pf/0,,1104_12169_0,00.html).

¹⁸ Daniel Johnston, “The value of reserves changes throughout the prospect/field life cycle,” Figure 8-2 in “Value of Reserves” (Draft course workbook), August 2006.

¹⁹ Letter from Douglas Holtz-Eakin to Senator Russell Feingold, March 14, 2005, p. 3.

²⁰ “The Tale of the ‘Winner’s Curse:’ Bidding Science Saved \$\$,” *AAPG Explorer*, December 2004.

has observed that “[f]or the past two decades the exploration end of the business has been notoriously unprofitable,” in part due to “over-optimistic estimates of: oil prices, costs, prospect sizes, and success ratios.”²¹ In 2004, a report by the consulting firm Wood Mackenzie concluded that unprofitable exploration economics call into question how much money from high oil prices the industry will plow back into competitive exploration.²² Does the widely recognized phenomenon of overbidding assure high bids for acreage that might be leased on the Arctic Refuge Coastal Plain? Or are prospective oil companies on the North Slope already taking a much more cautious attitude toward high-end lease bonus gambling, as indicated by the consistently low bids offered for ANS and GOM acreage over the last quarter century?

- Although CBO’s second argument appears to imply that bidding companies were willing to spend \$1.00 per barrel for reserves discovered between 1969 and 1984, this estimate does not stand up under scrutiny. One problem is that the preponderance of ANS proved reserves were discovered on leases issued before 1969. ANS lease bidding between 1969 and 1984 (often at high lease bonus bid prices fueled by the super-giant Prudhoe Bay discovery) added only four relatively small discoveries to the existing North Slope reserves.²³ A second problem is that CBO did not specify the classification of reserves to which it refers. This is an important omission because, as noted above, proven, discovered reserves typically carry significantly higher economic value than undiscovered reserves.²⁴ While the import of the ANS reserves data cited by CBO is not clear, this background information supports the understanding that the last two decades of reduced ANS bids may have resulted at least in some measure from industry recognition of the “winner’s curse.”
- Higher expectations regarding the size of potential Arctic Refuge discoveries, relative to less prospective acreage elsewhere on the North Slope, are likely to lift Arctic Refuge lease bonus bids. But two counters to this argument are worthy of note. The first is the fact that the USGS has reported that there is little chance of discovering a super-giant field on the Arctic Refuge Coastal Plain.²⁵ The recent diversion between ANS and GOM lease bonus bids further undercuts this argument. As shown in Figure 2, since 2001 GOM lease bonus bids have risen, relative to the consistently low offerings of the last two decades, while ANS lease bonus bids continue to decline, despite rising oil prices. This divergence raises the possibility that increases in ANS bid offerings due to the

²¹ Daniel Johnston, “The Bidding Dilemma—A Twenty-Year Retrospective,” originally published in *Petroleum Accounting and Financial Management Journal*, Spring 2002 (updated by Johnston for his seminar, “International Petroleum Fiscal Systems and Production Sharing Contracts, October 2004).

²² James Boxell, “Top oil groups fail to recoup exploration costs,” *New York Times*, Oct. 10, 2004.

²³ The four fields discovered between 1970 and 1984 that have resulted in commercial production (North Prudhoe [1970], Endicott [1978], Niakuk [1981] and Seal Island [1982]) have produced approximately 0.64 billion of an estimated 0.9 billion barrels expected during their lives. (See: EG&G Idaho, Inc., *Alaska Oil and Gas: Energy Wealth or Vanishing Opportunity?* [January 1991], Tables 2.1 and 2.2; and Alaska Department of Natural Resources, “Oil Production – Historic,” in Division of Oil & Gas, *Annual Report* [May 2006], pp. 3-3 - 3-6.)

²⁴ In January 1985 the Alaska Department of Natural Resources (ADNR) estimated that North Slope reserves totaled 6.6 billion to 12.3 billion barrels of proved reserves, depending on oil prices. To this volume of proved reserves, ADNR added another 10.2 billion barrels of undiscovered reserves that the department estimated would be available at high oil prices. (Alaska Department of Natural Resources, “Estimated Recoverable Reserves and Royalty Share” [Jan. 14, 1985 estimate] in *Historical and Projected Oil and Gas Consumption*, 1985 p. 11.)

²⁵ USGS believes that Arctic Refuge production would come from numerous small fields, rather than from a super-giant field, which would be more economically efficient. See: Emil Attanasi and J.H. Schuenemeyer, “Frontier areas and resource assessment: Case of the 1002 area of the Alaska North Slope,” U.S.G.S. Open File Report 02-119, circa 1999, p. 10.

attractiveness of acreage offered might lag similar expectation-induced increases seen in the GOM. While both counters to third argument are potentially significant, neither response settles this issue. This fundamental question remains: To what extent might optimistic expectations associated with the Arctic Refuge Coastal Plain increase lease bonus bid rates? More detailed consideration of this issue follows.

The extraordinary gap between the low historical ANS and GOM lease bonus payments over the last quarter century, on the one hand, and the agency estimates, on the other, is demonstrated by this simple exercise in multiplication:

- If the average 2006 GOM lease bonus bid rate of \$286 per leased acre – an amount that doubled the 2001-2005 GOM average – doubled twice more and then increased eight-fold, the resulting lease bonus bid payments for 600,000 acres would still fall short of CBO's 2008 estimate of \$6.0 billion total for lease bonus revenue from the Arctic Refuge Coastal Plain.²⁶
- If these hypothetical increases (doubling, followed by two more doublings and an eight-fold increase) were applied to the lower 2001-2005 ANS average lease bonus bid rate, the resulting lease bonus bid payment on 600,000 acres would still be less than the low end of the CBO projections for the Arctic Refuge.²⁷

Defenders of high agency estimates for Arctic Refuge lease bids say that the much higher agency estimates are based on the value of potential reserves, as determined by model calculations and confirmed in discussions with informed industry observers. It is further argued that one reason for the relatively low ANS and GOM bid offerings is that government leasing agencies are recycling previously offered ANS and GOM acreage that is of little interest and therefore of little value.²⁸

One problem with this explanation is the assumptions about the attractiveness (or unattractiveness) of the acreage being offered. Although many ANS offerings may be relatively unattractive, this explanation does not account for this fact: After the Alpine discovery west of Prudhoe Bay in 1994, lease bonus bid payments for acreage in that vicinity doubled average bids elsewhere on the North Slope but did not even begin to close the gap.²⁹

The results from the March 205 MMS lease sale in the Beaufort Sea, which included near-shore waters just north of the Arctic Refuge Coastal Plain, raise similar questions. In that sale, 607,285 acres were leased for an average of \$76.96 per leased acre.³⁰ That lease sale included two fields previously discovered, each estimated to contain more than 200 million barrels of oil. Even with the costs of drilling to find oil eliminated on those two deposits, bids on the tracts that

²⁶ As shown in Appendix Figures A2 and A5 and the preceding section, the GOM March 2006 sale generated average lease bonus bids of approximately \$286 per leased acre – approximately twice the 2001-2005 average. $\$286 * 2 * 2 * 8 = \$9,512$. per leased acre; $\$9,512 * 600,000$ acres = \$5,491,200,000 [\$5.491 billion].

²⁷ As shown in Appendix Figures A1 and A5 and the preceding section, the 2001-2005 average for ANS lease bonus bids was approximately \$43.13 per leased acre. $\$43.13 * 2 * 2 * 2 * 8 = \$2,760.32$ per leased acre; $\$2,760.32 * 600,000$ acres = \$1,656,192,000, [\$1.656 billion].

²⁸ CBO staff, personal communication, Dec. 8, 2006.

²⁹ The three lease sales in the vicinity of Alpine – Alaska North Slope Lease Sale #86A (1996) and U.S. Bureau of Land Management Sales NPR-A I (1999) and NPR-A II (2002) – were discussed in the author's 2005 report at pages 10-12.

³⁰ U.S. Minerals Management Service Lease Sale #195 (for summary results, see Appendix Figure A1).

touched one of these discoveries generated only \$500.00 per leased acre,³¹ while bids on the second discovery were so low that the MMS was forced to reject them.³² Thus, two ANS areas with known discoveries generated significantly less revenue than the agencies estimate leasing for undiscovered resources on the Arctic Refuge Coastal Plain would generate.

But the main problem with the “unattractiveness” theory is that it may not apply to the GOM, which is recognized as one of the best petroleum prospects in the world.³³ GOM deep water drilling is very expensive, but the discovery rate is high, as evidenced by the fact that since 2001 there have been at least a dozen major GOM deep water discoveries.³⁴ Because of the difficulties of deep water drilling, less than 10 percent of leased GOM deep water tracts are ever drilled. For this reason, MMS expects a large number of leases to revert to the government possession for re-leasing in coming years.³⁵ In light of this complex and unfolding pattern of intense exploration activity and major discoveries, it appears to be an over-simplification to attribute the relatively low GOM lease bonus bid offerings (in comparison to agency estimates) to the lack of attractiveness of the acreage being offered.

In its 2005 letter, CBO advised the senators that “CBO does not consider average amounts paid per acre as a useful metric for predicting bonus bids.”³⁶ But there is an important distinction between the use of a measurement device to formulate a prediction and the use of that tool to describe results.³⁷ The author’s 2005 report and this update do not attempt to predict bonus bids from the Arctic Refuge Coastal Plain. Rather, these reports simply present empirical data showing that actual ANS lease bonus payments are much lower than those forecasted by the agencies.

³¹ The tracts in the vicinity of the Hammerhead discovery, totaling approximately 45,546 acres, netted \$22,910,256 in lease bonus bids, for an average of \$503.01 per leased acre (U.S. Minerals Management Service, “Bid Recap (All Bids by Area/Tract),” Beaufort Sea Sale Number 195, March 30, 2005, pp. 7 [Tract Nos. Y1804 through Y1809, Y1812 and Y1813]).

The Hammerhead bids provide an interesting cross-check in terms of dollars per barrel of discovered oil. The \$22.9 million offered in winning lease bonus bids for a discovered deposit estimated to contain 200 million barrels of oil nets out to an offering price of approximately 11.5 cents per barrel of discovered oil. At that rate, the 10.4 billion barrels of oil technically recoverable (undiscovered) oil estimated by the USGS to lie beneath the Arctic Refuge Coastal Plain would generate approximately \$1.2 billion – well below the CBO’s lower limit estimate. If unproven and undiscovered reserves in an unexplored prospect are worth one-sixth the value of known reserves, then the companies bidding on the Arctic Refuge Coastal Plain might be expected to spend a total of \$0.2 billion to obtain leases on the Arctic Refuge Coastal Plain.

³² The bids MMS rejected were on the Kuvlum discovery (“MMS rejects bids for Kuvlum in Beaufort,” *Petroleum News*, week of Oct. 23, 2005).

³³ Speaking on *60 Minutes* in 2002, British Petroleum CEO Sir John Browne commented that “the most important place to go and find oil is the United States.” When the reporter asked, “Now are you talking about ANWR up in Alaska?” Browne responded: “No, I’d like to first talk about the Gulf of Mexico, offshore Texas and Louisiana. . . . probably one of the greatest new oil provinces in the entire world” (CBS-TV, *60 Minutes*, Feb. 10, 2002 [from transcript]).

³⁴ Jad Mouawad, “Drilling Deep in the Gulf of Mexico,” *New York Times*, Nov. 8, 2006. According to this report: “While production from the Gulf’s shallow waters is declining, deepwater production is on an upswing. . . . According to the most optimistic estimates, there could be 40 billion barrels of undiscovered reserves in the deep water. . . . These reserves might lift the offshore output to 2.2 million barrels a day by 2012, up from 1.5 million barrels today. . . . Those point to the presence of a region that might hold as much as 15 billion barrels of reserves. . . . The latest and largest find in the Lower Tertiary, about 250 miles south of New Orleans, was announced in August by BP. . . . Last month, Royal Dutch Shell nounced that it would develop three ultradeep discoveries 200 miles south of the Texas coastline.”

³⁵ MMS, *Deepwater Gulf of Mexico 2006: America’s Expanding Frontier* (OCS Report MMS 2006-022), pp. 82, 84, 98, 101, 105.

³⁶ Letter from Douglas Holtz-Eakin to Senator Russell Feingold, p. 5.

³⁷ Lease sale results are typically described in terms of dollars per leased acre. See, for example: State of Alaska lease sale summary listings (<http://www.dog.dnr.state.ak.us>), federal lease sale summary reports (<http://www.mms.gov/alaska/lease/hlease/leasetable.htm>) and a consultant’s trade journal analysis of ANS leasing (David M. Haas, “The case of Alaska: modeling lease sales in a mature market,” *Oil & Gas Journal*, May 16, 2005, pp. 17, 40-41).

Conclusion

Two years of new Alaska North Slope (ANS) and Gulf of Mexico (GOM) lease bonus bid data confirm previous doubts and raises new concerns about the validity of agency estimates of lease bonus bid revenue from petroleum leasing on the Arctic National Wildlife Refuge Coastal Plain.

In 2006 ANS lease bonus bid payments averaged \$27.97 per leased acre. Despite high oil prices, these payments represented a decline from the 2001-2005 average of \$43.13 per leased acre. GOM lease bonus bid payments in 2006 averaged \$286.00 per leased acre, more than doubling the 2001-2005 average. In comparison to these relatively modest bonus bid offerings, the Congressional Budget Office (CBO) and the Administration have estimated that oil companies will bid, on average, \$10,000.00 to \$11,667.00 per leased acre to purchase drilling and exploration rights on the Arctic National Wildlife Refuge Coastal Plain.

Even if ANS lease bonus bids matched the recent doubling of GOM lease bonus bid payments, bidding at that level would generate far less revenue than CBO or the Administration have estimated. But the divergence between ANS and GOM bidding rates since 2001 suggests the possibility that even with new oil discoveries, ANS lease bonus bidding rates might lag the increase in GOM lease bonus bidding rates.

Review of industry reports on lease bonus bidding suggests that the relatively low ANS and GOM lease bonus bid payments experienced during the last quarter century may result in part from increasing industry recognition that lease bonus bidding is a form of high-stakes gambling that seldom pays off. The distinction between proved reserves that can be readily developed and undiscovered and unproven reserves estimated to lie beneath an unexplored area is central to this analysis. Because uncertainty reduces the value of an asset, lease bonus bids for unproven acreage are liable to be much lower than cash payments to purchase discovered reserves.

In light of the extraordinary differences between the agency projects and real-world results, the inputs and the mechanics of agency models used to estimate Arctic Refuge lease bonus bid revenue should be examined carefully. When model results vary markedly from empirical landmarks, those results should not be incorporated into public policy unless it can be demonstrated that the inputs and operation of the agency models are likely to produce results that accurately reflect real-world conditions. Agency analysts say that interviews with expert observers – some citing rules of thumb for lease bonus bid values – confirm the validity of their model results. These informal inputs also warrant close examination.

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Appendices

Figure A1. Alaska North Slope and Near-Shore Lease Sales, % Leased and Bonus Received per Acre, 1961 - 2006

Figure A2. MMS Gulf of Mexico Lease Sales, % Leased and Bonus Received per Acre, 1961 - 2006

Figure A3. Average Received per Leased Acre, 1961 – 1990 and 1991 – 2006

Figure A4. Average Received per Leased Acre By Decade, 1961 – 2006

Figure A5. Average Received per Leased Acre By Five-Year Periods, 1961 – 2006

Figure A1.

Alaska North Slope and Near-Shore Lease Sales, % Leased and Bonus Received per Acre, 1961 - 2006

Date	Sale (Leasing Agency and Sale No.)	Acreage Offered	Acreage Leased	Acreage Leased (% of Acreage Offered)	Bonus Received (\$)	Received per Acre Leased (\$/acre)
<i>(Sheet 1 of 2; see notes on following page.)</i>						
12/64	Mixed (Alaska #13) ⁽¹⁾	1,194,373	721,224	60.39%	\$5,537,100	\$7.68
7/65	North Slope (Alaska #14)	754,033	403,000	53.45%	\$6,145,473	\$15.25
9/69	North Slope (Alaska #23)	450,858	412,548	91.50%	\$900,041,605	\$2,181.67
12/79	Beaufort (MMS #BF / Alaska #30) ⁽²⁾	514,383	382,084	74.28%	\$1,056,082,635	\$2,764.01
9/80	North Slope (Alaska #31)	196,268	196,268	100.00%	\$12,387,470	\$63.12
1/82	NPR-A (BLM #821) ⁽³⁾	1,462,355	643,436	44.00%	\$57,100,000	\$88.74
5/82	NPR-A (BLM #822) ⁽³⁾	3,500,000	252,000	7.20%	\$9,700,000	\$38.49
5/82	Beaufort Sea (Alaska #36)	56,882	56,882	100.00%	\$32,583,452	\$572.83
9/82	North Slope (Alaska #34)	1,231,517	571,954	46.44%	\$26,713,018	\$46.70
10/82	Beaufort (MMS #71)	1,825,770	662,860	36.31%	\$2,055,632,336	\$3,101.16
5/83	Beaufort Sea (Alaska #39)	211,988	211,988	100.00%	\$20,998,101	\$99.05
7/83	NPR-A (BLM #831) ⁽³⁾	2,195,000	419,018	19.09%	\$16,657,000	\$39.75
5/84	Beaufort Sea (Alaska #43)	298,074	281,784	94.53%	\$32,214,794	\$114.32
5/84	North Slope (Alaska #43A)	76,079	76,079	100.00%	\$1,612,583	\$21.20 ?
7/84	NPR-A (BLM #841) ⁽³⁾	(n.a.)	0	0	\$0	\$0.00
8/84	Beaufort (MMS #87)	7,773,447	1,207,714	15.54%	\$866,860,327	\$717.77
9/85	North Slope (Alaska #45A)	606,385	164,885	27.19%	\$4,657,478	\$28.25
9/85	North Slope (Alaska #47)	192,569	182,560	94.80%	\$11,645,003	\$63.79
2/86	North Slope (Alaska #48)	526,101	266,736	50.70%	\$2,444,342	\$9.16
2/86	North Slope (Alaska #48A)	42,053	42,053	100.00%	\$510,255	\$12.13
1/87	North Slope (Alaska #51)	592,142	100,832	17.03%	\$289,625	\$2.87
6/87	Beaufort Sea (Alaska #50)	118,147	118,147	100.00%	\$6,621,723	\$56.05
1/88	North Slope (Alaska #54)	421,809	338,687	80.29%	\$4,683,388	\$13.83
3/88	Beaufort (MMS #97)	18,277,806	1,110,764	6.08%	\$115,267,636	\$103.77
9/88	Beaufort Sea (Alaska #55)	201,707	96,632	47.91%	\$14,700,602	\$152.13
9/88	North Slope (Alaska #69A)	775,555	368,400	47.50%	\$6,119,135	\$16.61
1/89	Beaufort Sea (Alaska #52)	175,981	52,463	29.81%	\$1,737,513	\$33.12
1/89	North Slope (Alaska #72A)	677	677	100.00%	\$454,977	\$672.05
1/91	North Slope (Alaska #70A)	532,153	420,568	79.03%	\$27,707,541	\$65.88
6/91	Beaufort (MMS #124)	18,558,976	277,004	1.49%	\$16,807,025	\$60.67
6/91	North Slope (Alaska #64)	754,542	34,143	4.52%	\$242,389	\$7.10
6/91	Beaufort Sea (Alaska #65)	491,091	172,865	35.20%	\$6,993,949	\$40.46
1/92	North Slope (Alaska #61)	991,087	260,550	26.29%	\$2,429,561	\$9.32
6/92	Beaufort Sea (Alaska #68)	143,445	0	0.00%	\$0	\$0.00
12/92	North Slope (Alaska #75)	217,205	124,832	57.47%	\$9,750,111	\$78.11
5/93	North Slope (Alaska #77)	1,260,146	45,727	3.63%	\$1,164,565	\$25.47
5/93	North Slope (Alaska #70A-W)	37,665	28,065	74.51%	\$1,358,027	\$48.39
9/93	North Slope (Alaska #57)	1,033,248	0	0.00%	\$0	\$0.00
9/93	North Slope (Alaska #75A)	14,343	14,343	100.00%	\$449,847	\$31.36
12/95	North Slope (Alaska #80)	951,302	151,567	15.93%	\$3,337,485	\$22.02

Figure A1.

Alaska North Slope and Near-Shore Lease Sales, % Leased and Bonus Received per Acre, 1961 - 2006

<i>Date</i>	<i>Sale (Leasing Agency and Sale No.)</i>	<i>Acreage Offered</i>	<i>Acreage Leased</i>	<i>Acreage Leased (% of Acreage Offered)</i>	<i>Bonus Received (\$)</i>	<i>Received per Acre Leased (\$/acre)</i>
<i>(Sheet 2 of 2)</i>						
9/96	Beaufort (MMS #144)	7,282,795	100,025	1.37%	\$14,429,363	\$144.26
10/96	North Slope (Alaska #86A)	15,484	5,901	38.11%	\$2,026,047 ⁽⁴⁾	\$343.34
11/97	Beaufort Sea (Alaska #86)	385,054	323,835	84.10%	\$27,985,125	\$86.42
6/98	North Slope (Alaska #87)	(Areawide)	518,689	(n.a.) ⁽⁵⁾	\$51,794,173	\$99.86
8/98	North Slope (MMS #170)	920,983	88,361	9.59%	\$5,327,093	\$60.29
2/99	North Slope (Alaska Areawide)	(Areawide)	174,923	(n.a.) ⁽⁵⁾	\$2,596,838	\$14.85
5/99	NPR-A (BLM # 1)	3,898,612	867,721	22.26%	\$104,635,728 ⁽⁶⁾	\$120.59
11/00	Beaufort Sea (Alaska Areawide)	(Areawide)	25,804	(n.a.) ⁽⁵⁾	\$338,922	\$13.13
11/00	North Slope (Alaska Areawide)	(Areawide)	657,520	(n.a.) ⁽⁵⁾	\$10,117,367	\$15.39
10/01	Beaufort Sea (Alaska Areawide)	(Areawide)	36,331	(n.a.) ⁽⁵⁾	\$3,447,734	\$94.90
10/01	North Slope (Alaska Areawide)	(Areawide)	434,938	(n.a.) ⁽⁵⁾	\$6,911,572	\$15.89
10/01	N. Slope Foothills (Alaska Areawide)	(Areawide)	858,811	(n.a.) ⁽⁵⁾	\$9,799,277	\$11.41
6/02	NPR-A (BLM #11 [<i>preliminary data</i>])		579,269	(n.a.) ⁽⁵⁾	\$63,811,496 ⁽⁶⁾	\$110.16
10/02	Beaufort Sea (Alaska Areawide)	(Areawide)	19,226	(n.a.) ⁽⁵⁾	\$506,405	\$26.34
10/02	North Slope (Alaska Areawide)	(Areawide)	32,315	(n.a.) ⁽⁵⁾	\$579,728	\$17.94
10/02	N. Slope Foothills (Alaska Areawide)	(Areawide)	213,374	(n.a.) ⁽⁵⁾	\$2,889,532	\$13.54
5/03	N. Slope Foothills (Alaska Areawide)	(Areawide)	5,760	(n.a.) ⁽⁵⁾	\$36,576	\$6.35
5/03	North Slope (Alaska Areawide)	(Areawide)	210,006	(n.a.) ⁽⁵⁾	\$3,586,400	\$17.08
5/03	Beaufort Sea (Alaska Areawide)	(Areawide)	36,995	(n.a.) ⁽⁵⁾	\$1,358,187	\$36.71
9/03	Beaufort Sea (MMS #186)	9,459,743	181,810	1.92%	\$8,903,568	\$48.97
5/04	N. Slope Foothills (Alaska Areawide)	(Areawide)	19,796	(n.a.) ⁽⁵⁾	\$106,305	\$5.37
6/04	NPRA (BLM 2004 [<i>preliminary data</i>])		1,403,561	(n.a.)	\$53,904,491 ⁽⁶⁾	\$38.41
10/04	North Slope (Alaska Areawide) ⁽⁶⁾	(Areawide)	225,280	(n.a.) ⁽⁵⁾	\$9,447,757	\$41.94
10/04	Beaufort Sea (Alaska Areawide) ⁽⁶⁾	(Areawide)	125,440	(n.a.) ⁽⁵⁾	\$5,280,384	\$42.09
3/05	Beaufort Sea (MMS #195)		607,285		\$46,735,081 ⁽⁷⁾	\$76.96 ⁽⁷⁾
5/05	N. Slope Foothills	(Areawide)	55,505	(n.a.) ⁽⁵⁾	\$319,959	\$5.76
3/06	N. Slope (#2006 [<i>preliminary</i>])	(Areawide)	599,040	(n.a.)	\$16,288,966	\$27.19
3/06	Beaufort Sea (#2006 [<i>preliminary</i>])	(Areawide)	231,680	(n.a.)	\$14,659,334	\$63.27
5/06	N. Slope Foothills (#2006 [<i>preliminary</i>])	(Areawide)	246,400	(n.a.) ⁽⁵⁾	\$1,849,229	\$7.50
10/06	N. Slope (#2006A [<i>preliminary</i>])	(Areawide)	177,280	(n.a.)	\$2,530,534	\$14.27
10/06	Beaufort Sea (#2006A [<i>preliminary</i>])	(Areawide)	33,280	(n.a.)	\$684,723	\$20.57
ANS + Beaufort Sea Subtotal (1961 - 1990)			9,341,675		\$5,269,397,571	\$564.07 ⁽⁸⁾
ANS + Beaufort Sea Subtotal (1991 - 2006)			10,625,825		\$543,128,393	\$51.11 ⁽⁸⁾
Total (71 North Slope and Beaufort Sea Lease Sales)			19,510,540		\$5,807,461,478	\$297.66 ⁽⁸⁾

Notes:

- (1) Includes non-North Slope acreage
- (2) Joint State-Federal sale 12/12/79. Federal portion -- 85,776 acres leased (49.5%) @ \$5,697.29 per acre; State portion -- 296,308 acres leased (86.7%) @ \$1,914.87 per acre
- (3) Sale data taken from U.S BLM, NE NPR-A Final Environmental Impact Statement (<http://aurora.ak.blm.gov/npra/final/html/3a1a2.html>)
- (4) Arctic Slope Regional Corp. received \$1,786,812 of this total.
- (5) Sale of previously offered acreage.
- (6) Bonus revenue split 50-50 with Alaska.
- (7) Subtotal for tracts adjacent to Arctic Refuge Coastal Plain: \$41,717,201 paid for 258,238 leased acres = \$161.55 per leased acre
- (8) Weighted Average

Sources:

"Summary of State Competitive Lease Sales," Alaska Department of Natural Resources (ADNR), Division of Oil and Gas 2000 Annual Report , pp. 105-107, and U.S. Department of the Interior (USDOI), Minerals Management Service, "List of Alaska Region Lease Sales," updated Aug. 4, 2005 (<http://www.mms.gov/alaska/lease/hlease/leasetable.htm>); additional information from ADNR and USDOI web sites.

Figure A2.

MMS Gulf of Mexico Lease Sales, % Leased and Bonus Received per Acre, 1961 - 2006

<i>Date</i>	<i>Sale (MMS Sale No.)</i>	<i>Acreage Offered</i> ⁽¹⁾	<i>Acreage Leased</i>	<i>Acreage Leased</i> <i>(% of Acreage Offered)</i>	<i>Bonus Received</i> <i>(\$)</i>	<i>Received per Acre Leased</i> <i>(\$/acre)</i>
<i>(Sheet 1 of 2)</i>						
03/13/62	LA (9)	1,808,276	956,407	52.89%	177,260,305	\$185.34
03/16/62	TX, LA (10)	1,875,964	956,592	50.99%	268,333,397	\$280.51
10/09/62	LA (11)	33,855	16,178	47.79%	43,887,359	\$2,712.78
04/28/64	LA (12)	34,028	32,671	96.01%	60,340,626	\$1,846.92
03/29/66	LA (14)	35,993	35,056	97.40%	88,845,963	\$2,534.40
10/18/66	LA (15)	227,898	104,717	45.95%	99,164,930	\$946.98
06/13/67	LA (16)	971,489	744,456	76.63%	510,079,178	\$685.17
05/21/68	TX (18)	728,551	541,304	74.30%	593,899,046	\$1,097.16
11/19/68	LA (19)	46,824	29,679	63.38%	149,868,759	\$5,049.66
01/14/69	LA (19A)	96,389	48,504	50.32%	44,037,339	\$907.91
12/16/69	LA (19B)	93,764	60,153	64.15%	66,908,196	\$1,112.30
07/21/70	LA (21)	73,360	44,642	60.85%	97,769,013	\$2,190.07
12/15/70	LA (22)	593,485	553,898	93.33%	847,295,760	\$1,529.70
01/14/71	LA (23)	55,872	37,222	66.62%	96,304,526	\$2,587.30
09/12/72	LA (24)	366,682	290,321	79.18%	585,827,925	\$2,017.86
12/19/72	LA (25)	604,029	535,874	88.72%	1,665,519,631	\$3,108.04
06/19/73	TX, LA (26)	697,643	547,173	78.43%	1,591,397,380	\$2,908.40
12/20/73	MAFLA (32)	817,297	485,397	59.39%	1,491,065,231	\$3,071.85
03/28/74	LA (33)	930,918	421,218	45.25%	2,092,510,854	\$4,967.76
05/29/74	TX (34)	1,355,678	565,112	41.68%	1,471,851,831	\$2,604.53
07/30/74	TX, LA (S1)	1,298,739	100,241	7.72%	30,236,800	\$301.64
10/16/74	LA-ROY (0)	51,515	40,755	79.11%	1,018,875	\$25.00
10/16/74	LA (36)	1,370,031	634,832	46.34%	1,427,242,455	\$2,248.22
02/04/75	TX (37)	2,870,344	626,585	21.83%	274,690,955	\$438.39
05/28/75	TX, LA (38)	1,346,432	406,942	30.22%	232,916,050	\$572.36
07/29/75	TX, LA (38A)	1,772,958	336,301	18.97%	163,214,006	\$485.32
02/18/76	GOM (41)	687,604	161,286	23.46%	175,976,493	\$1,091.08
11/16/76	TX, LA (44)	254,488	178,127	69.99%	379,148,962	\$2,128.53
06/23/77	GOM (47)	1,074,536	605,427	56.34%	1,170,093,432	\$1,932.67
04/25/78	TX, LA (45)	709,727	438,756	61.82%	733,656,893	\$1,672.13
10/31/78	GOM (65)	511,709	201,295	39.34%	61,176,730	\$303.92
12/19/78	TX, LA (51)	643,987	412,416	64.04%	871,464,998	\$2,113.07
07/31/79	GOM (58)	577,517	391,183	67.74%	1,247,489,022	\$3,189.02
11/27/79	GOM (58A)	588,601	421,519	71.61%	1,913,337,938	\$4,539.15
09/30/80	GOM (A62)	909,575	551,654	60.65%	2,676,927,673	\$4,852.55
11/18/80	GOM (62)	458,308	383,323	83.64%	1,417,961,511	\$3,699.13
07/21/81	GOM (A66)	1,077,931	799,912	74.21%	2,649,628,752	\$3,312.40
10/20/81	GOM (66)	1,081,364	508,301	47.01%	1,243,468,752	\$2,446.32
02/09/82	GOM (67)	1,219,847	590,265	48.39%	1,193,654,719	\$2,022.24
11/17/82	GOM (69[1])	732,570	281,213	38.39%	609,178,223	\$2,166.25
03/08/83	GOM (69[2])	665,478	58,120	8.73%	37,570,900	\$646.44
05/25/83	CGOM (72)		3,089,872		3,367,606,134	\$1,089.89
08/24/83	WGOM (74)		2,246,005		1,501,712,517	\$668.61
01/15/84	EGOM (79)		897,786		310,586,261	\$345.95
04/24/84	CGOM (81)		2,278,179		1,323,036,649	\$580.74
07/18/84	WGOM (84)		1,949,213		844,850,488	\$433.43
05/22/85	CGOM (98)		2,076,908		1,079,377,760	\$519.70
08/14/85	WGOM (102)		1,075,189		359,175,656	\$334.06
12/18/85	EGOM (94)		421,464		119,097,298	\$282.58
04/30/86	CGOM (104)		504,814		130,276,757	\$258.07
08/27/86	WGOM (105)		229,613		56,817,990	\$247.45
04/22/87	CGOM (110)		1,539,626		262,971,486	\$170.80
08/12/87	WGOM (112)		1,908,199		234,275,520	\$122.77

Figure A2.

MMS Gulf of Mexico Lease Sales, % Leased and Bonus Received per Acre, 1961 - 2006

<i>Date</i>	<i>Sale (MMS Sale No.)</i>	<i>Acreage Offered</i> ⁽¹⁾	<i>Acreage Leased</i>	<i>Acreage Leased</i> <i>(% of Acreage Offered)</i>	<i>Bonus Received</i> <i>(\$)</i>	<i>Received per Acre Leased</i> <i>(\$/acre)</i>
<i>(Sheet 2 of 2)</i>						
03/30/88	CGOM (113)		3,416,759		388,730,457	\$113.77
08/31/88	WGOM (115)		1,412,764		125,352,889	\$88.73
11/16/88	EGOM (116[1])		657,348		41,582,298	\$63.26
03/15/89	CGOM (118)		2,892,535		388,393,077	\$134.27
08/23/89	WGOM (122)		2,688,394		257,224,333	\$95.68
03/21/90	CGOM (123)		2,604,259		424,334,314	\$162.94
08/22/90	WGOM (125)		1,659,187		159,967,604	\$96.41
03/27/91	CGOM (131)		2,224,284		256,286,186	\$115.22
08/21/91	WGOM (135)		753,059		58,646,034	\$77.88
05/13/92	CGOM (139)		693,079		54,373,022	\$78.45
08/19/92	WGOM (141)		327,840		30,463,793	\$92.92
03/24/93	CGOM (142)		906,587		63,897,083	\$70.48
09/15/93	WGOM (143)		807,871		62,570,163	\$77.45
03/30/94	CGOM (147)		1,749,480		274,335,726	\$156.81
08/17/94	WGOM (150)		1,025,534		57,031,346	\$55.61
05/10/95	CGOM (152)	31,228,295	2,896,426	9.28%	\$303,772,054	\$104.88
09/13/95	WGOM (155)	28,471,385	1,445,239	5.08%	\$110,235,596	\$76.27
04/24/96	CGOM (157)	30,322,792	4,641,292	15.31%	\$511,555,568	\$110.22
09/25/96	WGOM (161)	28,389,057	3,407,403	12.00%	\$352,180,828	\$103.36
03/05/97	CGOM (166)	27,159,926	5,234,895	19.27%	\$810,843,418	\$154.89
08/27/97	WGOM (168)	25,809,126	4,392,513	17.02%	\$599,567,041	\$136.50
03/18/98	CGOM (169)	22,548,869	4,100,377	18.18%	\$784,120,709	\$191.23
08/26/98	WGOM (171)	20,637,942	2,155,053	10.44%	\$530,885,109	\$246.34
03/17/99	CGOM (172)	20,368,705	972,221	4.77%	\$159,109,825	\$163.66
08/25/99	WGOM(174)	19,850,625	802,617	4.04%	\$90,147,805	\$112.32
03/15/00	CGOM (175)	22,285,092	1,709,289	7.67%	\$292,771,205	\$171.28
08/26/00	WGOM (177)	20,608,737	1,210,631	5.87%	\$149,027,269	\$123.10
03/28/01	CGOM (178-1)	23,185,334	2,702,412	11.66%	\$499,683,478	\$184.90
03/28/01	EGOM (178-2)	250,786	0	0.00%	\$0	\$0.00
08/22/01	WGOM(180)	22,370,704	1,754,860	7.84%	\$163,627,562	\$93.24
12/05/01	EGOM (182)	1,342,080	547,200	40.77%	\$340,474,113	\$622.21
03/20/02	CGOM (182)	23,422,552	2,465,836	10.53%	\$355,792,253	\$144.29
08/21/02	WGOM(184)	22,270,482	1,727,068	7.75%	\$148,556,145	\$86.02
03/19/03	CGOM (185)	23,353,043	2,717,819	11.64%	\$297,598,165	\$109.50
08/20/03	WGOM (187)	21,705,925	1,867,847	8.61%	\$145,917,314	\$78.12
12/10/03	EGOM (189)	794,880	80,640	10.14%	\$8,376,765	\$103.88
03/17/04	CGOM (190)	22,727,885	2,718,753	11.96%	\$364,024,583	\$133.89
08/18/04	WGOM (192)	21,205,116	1,970,949	9.29%	\$169,928,999	\$86.22
03/16/05	EGOM (197)	714,240	57,600		\$6,595,753	\$114.51
03/16/05	CGM (194)	21,429,724	2,035,414		\$342,027,467	\$168.04
08/17/05	WGOM (196)	20,331,612	1,935,668		\$283,441,874	\$146.43
03/15/06	CGOM (198)	21,371,541	2,032,684		\$581,820,861	\$286.23
GOM SUBTOTAL (1961-1990)			48,683,141		41,927,590,876	\$861.23 ⁽²⁾
GOM SUBTOTAL (1991-2006)			66,070,440		9,259,685,112	\$140.15 ⁽²⁾
GOM TOTAL (1961-2006)			114,753,581		51,187,275,988	\$446.06 ⁽²⁾

Notes:

(1) Includes re-offered acreage.

(2) Weighted averages.

Sources:

U.S. Dept. of the Interior (Minerals Management Service, Gulf of Mexico OCS Region), *Table 2. Gulf of Mexico Oil & Gas Lease Offerings* (http://www.gomr.mms.gov/homepg/lseale/swiler/Table_2.PDF; accessed 10/27/06); high bids from various MMS reports.

Figures A3 - A5.

Alaska North Slope and MMS Gulf of Mexico Average Received per Leased Acre, 1961-2006 (by Selected Periods)

Figure A3.

Average Received per Leased Acre, 1961 - 1990 and 1991 - 2006

Period	Alaska North Slope and Near-Shore Lease Sales		MMS Gulf of Mexico Lease Sales	
	No. of Sales	Weighted Average Received per Acre Leased (\$ / Acre)	No. of Sales	Weighted Average Received per Acre Leased (\$ / Acre)
1961 - 1990	28	\$564.07	60	\$861.23
1991 - 2006	43	\$51.11	35	\$140.15
1961 - 2006 Total	71	\$297.66	95	\$446.06

Source: Data compiled from MMS, BLM and State of Alaska Division of Oil and Gas web sites (see Figures A1, A2).

Figure A4.

Average Received per Leased Acre By Decade, 1961 - 2006

Period	Alaska North Slope and Near-Shore Lease Sales		MMS Gulf of Mexico Lease Sales	
	No. of Sales	Weighted Average Received per Acre Leased (\$ / Acre)	No. of Sales	Weighted Average Received per Acre Leased (\$ / Acre)
1961 - 1970	3	\$593.27	13	\$738.97
1971 - 1980	2	\$1,847.44	23	\$2,481.61
1981 - 1990	23	\$455.16	24	\$478.09
1991 - 2000	21	\$67.44	20	\$133.92
2001 - 2006	22	\$40.05	15	\$134.42
1961 - 2006 Total	71	\$297.66	95	\$446.06

Source: Data compiled from MMS, BLM and State of Alaska Division of Oil and Gas web sites (see Figures A1, A2).

Figure A5.

Average Received per Leased Acre By Five-Year Periods, 1961 - 2006

Period	Alaska North Slope and Near-Shore Lease Sales		MMS Gulf of Mexico Lease Sales	
	No. of Sales	Weighted Average Received per Acre Leased (\$ / Acre)	No. of Sales	Weighted Average Received per Acre Leased (\$ / Acre)
1961 - 1965	2	\$10.39	4	\$280.26
1966 - 1970	1	\$2,187.67	9	\$1,155.13
1971 - 1975	0	\$0.00	13	\$2,212.38
1976 - 1980	2	\$1,847.44	10	\$2,843.06
1981 - 1985	13	\$662.92	13	\$899.62
1986 - 1990	10	\$61.24	11	\$126.58
1991 - 1995	12	\$45.92	10	\$99.12
1996 - 2000	9	\$79.36	10	\$149.52
2001 - 2005	17	\$43.13	14	\$138.43
2006	5	\$27.97	1	\$286.23
1961 - 2006 Total	71	\$297.66	95	\$446.06

Source: Data compiled from MMS, BLM and State of Alaska Division of Oil and Gas web sites (see Figures A1, A2).