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The National Petroleum Reserve – Alaska (NPRA)

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Summary

In May 2002, the United States Geological Survey (USGS) released revised estimates of the oil and gas resources that may lie beneath the surface of the National Petroleum Reserve Alaska (NPRA), an area of more than 20-million acres that lies West of the Arctic National Wildlife Refuge (ANWR). Significantly higher than previous estimates, these numbers may be considered by House and Senate conferees as they seek to reach agreement on a mutually acceptable energy bill (H.R. 4). The House-passed version of omnibus energy legislation, H.R. 4, would allow oil and gas leasing in ANWR (limiting the footprint of development to 2,000 acres of the coastal plain). The Senate version contains no ANWR provision.

The NPRA did not figure in the floor debates on H.R. 4. However, some may now argue that the promise of NPRA makes development of ANWR less urgent and that, in any event, greater emphasis should be placed on conservation policies and utilization of alternative and renewable energy sources. However, there is no inherent irreconcilability between ANWR and NPRA, and nothing to preclude making it a matter of policy to develop both areas.

The Naval Petroleum and Oil Shale Reserves were established in the early 1900s to assure availability of fuels for the Navy, which was converting its ships from coal to oil prior to World War I. In 1923, by Executive Order, President Warren G. Harding established one of these reserves in northern Alaska. Over time, the original rationale for the Naval Petroleum Reserves faded. In 1981, stewardship of the Alaskan Reserve passed from the Navy to the Department of the Interior (DOI), and the area was designated the National Petroleum Reserve-Alaska (NPRA). The Naval Petroleum Reserves Production Act (P.L. 96-514) authorized the Secretary of the Interior to conduct oil and gas leasing and development in the NPRA. The USGS had estimated that the NPRA could hold technically recoverable resources of 820 million to 5.4 billion barrels of oil. Lease sales were held during 1983-85, but none of these leases was developed and all have expired.

However, the new estimates for NPRA present a more optimistic picture, estimating 1.3 billion barrels economically recoverable at a price of $22/barrel (bbl), and 5.6 billion barrels economically recoverable with a market price of $30/bbl (2001 constant dollars). Technically recoverable oil is estimated at 5.9-13.2 billion barrels; the mean estimate is 9.3 billion barrels. Discovery of hydrocarbon deposits in 1996 just east of the NPRA has also contributed to expectations about the resources that might lie under the surface of the NPRA.

NPRA lease sales were held again in May 1999 and June 2002. The FY2002 Interior and Related Agencies Appropriations Act (P.L. 107-63) provided $2 million in funding for preparation of an Environmental Impact Statement (EIS) in anticipation of holding a lease sale in 2004 for tracts in the northwestern NPRA.

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Introduction

In May 2002, the United States Geological Survey (USGS) released revised estimates of the oil and gas resources that may lie beneath the surface of the National Petroleum Reserve Alaska (NPRA), an area of more than 20-million acres that lies West of the Arctic National Wildlife Refuge (ANWR). Significantly higher than previous estimates, these numbers may be considered by the House and Senate conferees in their delibetations to reach agreement on a mutually acceptable energy bill. The House-passed version of omnibus energy legislation, H.R. 4, would allow oil and gas leasing in ANWR (limiting the footprint of development to 2,000 acres of the coastal plain). The Senate version contains no ANWR provision.

This report provides a history of the NPRA and discusses the most recent estimates.

Background

The Naval Petroleum and Oil Shale Reserves were established in the early 1900s to assure availability of fuels for the Navy, which was converting its ships from coal to oil prior to World War I. The oil reserve consisted first of three fields in California and Wyoming. In 1923, by Executive Order, President Warren G. Harding established a fourth petroleum reserve in northern Alaska, designated Pet-4. Over time, the original rationale for the Naval Petroleum Reserves faded; moreover, the likelihood of a sustained interruption in oil supply diminished, and markets had shown a capacity to set prices and allocate supply during periods of uncertainty. In 1981, stewardship of the Alaska Reserve passed from the Navy to the Department of the Interior (DOI), and designation of Pet-4 was changed to National Petroleum Reserve-Alaska (NPRA). The Naval Petroleum Reserves Production Act (P.L. 96-514) authorized the Secretary of the Interior to conduct oil and gas leasing and development in the NPRA. Lease sales were held during 1983-85 on nearly 9 million acres of the more than 20 million acre Reserve. None of these leases was developed and all have expired.

As production from the Alaskan North Slope fell from a peak of slightly more than 2.0 million barrels per day (mbd) in 1988 to an estimated average of 1.2 mbd during the first half of 1998,[1] many Alaskans expressed support for exploration of NPRA in the hopes that production from that area would help offset the decline in

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[1]U.S. Department of Energy. Energy Information Administration. Petroleum Supply Monthly: July 1998, p. 6. DOE/EIA-0109 (98/07).

royalty payments from lower Prudhoe Bay production. Royalties on production from the NPRA, currently set at 16 2/3%, are equally divided between the State and the U.S. Treasury.[2] Production from NPRA, some argued, might also assure sufficient throughput to keep the Trans-Alaska Pipeline running.

Figure 1. Map of Northern Alaska

Figure 1. Map showing locations and relative sizes of the National Petroleum Reserve in Alaska (NPRA) and the Arctic National Wildlife Refuge (ANWR). The Trans-Alaska Pipeline System (TAPS) and "feeder" pipelines extending east and west of Prudhoe Bay show the extent of existing petroleum infrastructure. Locations of the Alpine and Prudhoe Bay oil fields and the Point Thomson gas and oil accumulation also are shown.
Source: U.S. Geological Survey

NPRA: Early Exploration and Leasing

In early 1997, the Bureau of Land Management (BLM) within DOI initiated a study of a 4.6 million acre section in the northeast portion of the NPRA, and preparation of an Environmental Impact Statement (EIS) required by the National Environmental Policy Act (NEPA) to serve as the basis for management of the area. This tract of NPRA comprises an area north of Umiat – where one oil reservoir had been discovered – and west from the Colville River to the Ikpikpuk River.[3] The discovery of hydrocarbon deposits the previous year, just east of the NPRA perimeter, was an important factor in initiating development of a leasing proposal. Since November 2000, Phillips Alaska Inc. has been producing this site just outside

[2]U.S. Department of the Interior. Minerals Management Service. Mineral Revenues 2000. Preliminary, p. 98, 131.

[3]For a map of the NPRA area that was under review, as well as extensive information about the area, see: http://wwwndo.ak.blm.gov/npra/final/pdf/FI_3.PDF.

NPRA, known as the Alpine field, where recoverable reserves are estimated between 365-430 million barrels, significantly exceeding initial expectations. [4]

In announcing the planning process in 1997, BLM indicated the objectives were to determine whether there were lands that could be leased, and what additional measures might be required to protect the habitat for waterfowl and the caribou herd. Comment was invited on six alternatives, or courses of action, including one to do nothing, and one preferred alternative.

On August 6, 1998, BLM released its Final Integrated Activity Plan and Environmental Impact Statement (IAP/EIS) for leasing in this area.[5] The IAP/EIS imposed a number of restrictions intended to strike a reasonable balance between permitting exploration and protecting the environment.[6] BLM officials in Alaska estimated that the quadrant under review for leasing could hold 500 million to 2.2 billion barrels of recoverable reserves, assuming a crude oil price of $18-20/barrel.[7]

A lease sale was held on May 5, 1999, and drew 174 bids from six different companies on 3.9 million acres. More than 130 bids were accepted, totaling $104.6 million. Most of them awarded to BP Exploration (Alaska) Inc. and Arco Alaska Inc. Subsequently, Phillips Petroleum acquired the assets of Arco Alaska as required by an order from the Federal Trade Commission.[8] In the spring of 2001, Phillips Alaska Inc. and Anadarko Petroleum Corp. reported discoveries of oil or gas and condensate not far from the Alpine field, but located in NPRA. Phillips indicated that these discoveries might be commercial and possibly comparable in size to the Alpine field.[9] By early October 2001, Anadarko had initiated securing permits to drill two additional prospects.[10]

Another lease sale in early June 2002 leased an additional 60 tracts comprising nearly 580,000 acres for $63.8 million. Phillips Alaska and Anadarko submitted bids jointly and were awarded 34 tracts for a total of $9.6 million. New to the NPRA

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[4]American Geological Institute. Update on National Petroleum Reserve-Alaska (5-11-00). www.agiweb.org/gap/legis106/npra.html. Phillips and Conoco merged on Aug. 30, 2002.

[5]The IAP/EIS is on-line att: http://wwwndo.ak.blm.gov/npra/final/html/contents_vol1.html.

[6]U.S. Department of the Interior. Bureau of Land Management. Northeast National Petroleum Reserve-Alaska. Final Integrated Activity Plan/Environmental Impact Statement. August 1998.

[7]Oil & Gas Journal, Aug. 24, 1998. NPRA Sale Plan Carries Heavy Restrictions, p. 26.

[8]U.S. Federal Trade Commission. Press release. FTC Clears Merger of BP Amoco and Atlantic Richfield Company. Apr. 13, 2000.

[9]Ibid., p. 73. See also: Petroleum Economist. Firms Drift Down Coastal Plain. July 4, 2002: p. 31.

[10]Oil & Gas Journal, June 11, 2001. NPRA Leasing A Model of Responsible Oil and Gas Development in Alaska, p. 20 et seq. See also Petroleum News Alaska, Vol. 6, No. 11. Week of Oct. 7, 2001. Anadarko Will Use Phillips' Ice Roads to Reach Altamura Prospect in NPRA, p. A11

lease sale was TotalFinaElf E&P, which bid $53.5 million for 20 tracts. EnCana Oil and Gas (USA) Inc. bid $920,000 for five tracts.[11]

The FY2002 Interior and Related Agencies Appropriations Act (P.L. 107-63) provided $2 million in funding for planning, and preparation of an EIS, in anticipation of holding a lease sale in 2004 for tracts in the northwestern NPRA. This EIS is projected to be completed by the end of 2003.[12]

USGS Estimates of NPRA Oil Reserves

Measurement of resources is often expressed in different ways, beginning with "in-place" resources, which the USGS defines as the volume of petroleum contained in accumulations of at least 50 million barrels of oil equivalent, without regard to its recoverability. Recoverability falls into two categories – "technically recoverable" and "economically recoverable" reserves. Technically recoverable resources are defined by the USGS as the volume of in-place resources that may be recoverable with currently available technology and without regard to cost. Economically recoverable resources are the volume of technically recoverable resources "for which the cost of discovery, development, production, and transport, including a return to capital, can be recovered at a given market price."[13]

The USGS had estimated in the 1980s that the NPRA could hold technically recoverable resources of 820 million (95% probability) to 5.4 billion barrels (5% probability) of oil. The most recent evaluation of the potential resources in NPRA, reported in late May 2002, present a more optimistic picture. The USGS estimates 1.3 billion barrels economically recoverable at a price of $22/barrel (bbl), and 5.6 billion barrels economically recoverable with a market price of $30/bbl (see Table 1). Technically recoverable oil has been estimated at 5.9-13.2 billion barrels (95% and 5% probability, respectively); the mean estimate is 9.3 billion barrels.

More detailed estimates released by the USGS in 1998 of the potential of ANWR in the 1.5 million acre "1002 area" coastal plain suggested that there was a 95% chance of finding technically recoverable oil resources of 4.25 billion barrels, and a 5% chance of finding 11.8 billion barrels or more. The mean estimate was 7.7 billion barrels.[14] (See Table 2.)

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[11]The federal government shares 50% of the bids with the state of Alaska. U.S. Department of the Interior. Bureau of Land Management. Press release, June 3, 2002: http://wwwndo.ak.blm.gov/npra/news.html#lease

[12] Petroleum News Alaska, Vol. 6, No. 15. Week of Nov. 4, 2001. Federal Agencies in Alaska Gear Up To Meet U.S. Energy Needs, p. 1, 14-15.

[13] United States Geological Survey. Fact Sheet 045-02. U.S. Geological Survey 2002 Petroleum Resource Assessment of the National Petroleum Reserve in Alaska (NPRA), p. 6. To see entire document: http://geopubs.wr.usgs.gov/fact-sheet/fs045-02/fs045-02.pdf

[14] For further background on the history of ANWR and proposals for its development, see CRS Issue Brief IB10094, The Arctic National Wildlife Refuge: Legislative Issues. Continuously updated. See also: CRS Report RL31278. Arctic National Wildlife Refuge:

(continued...)

Table 1. NPRA Resource Assessments 1980 and 2002 (technically recoverable)

	Oil (billion bbl)			Gas (tcf)		
	F_{95}	Mean	F_{05}	F_{95}	Mean	F_{05}
1980 assessment[1]	0.3	2.1	5.4	1.8	8.5	20.4
2002 assessment[2]	5.9	9.3	13.2	39.1	59.7	83.2

Note: F_{95} = 95% probability; F_{05} = 5% probability.

tcf = trillion cubic feet

[1] Includes entire NPRA, as native land selections had not been made. Does include state offshore areas. Reported gas resources are total gas (nonassociated and associated).

[2] Includes only the federal part of NPRA; native lands and adjacent state offshore areas are excluded. Gas resources are nonassociated gas only.

Source: United States Geological Survey. Fact Sheet 045-02. U.S. Geological Survey 2002 Petroleum Resource Assessment of the National Petroleum Reserve in Alaska (NPRA). To see entire document: http://geopubs.wr.usgs.gov/fact-sheet/fs045-02/fs045-02.pdf.

While not the focus of this report, the chart above reveals that USGS estimates of natural gas are also potentially significant. As of January 1, 2000, technically recoverable U.S. natural gas reserves in the lower 48 have been estimated at 167 tcf.[15] The USGS estimate of mean technically recoverable natural gas resources in NPRA represents 36% of lower 48 gas reserves. Less focus accrues to natural gas because, in the absence of a transportation system to move it, they are not commercial. However, the Senate version of H.R. 4, omnibus energy legislation currently in conference, provides loan guarantees and expedited procedures for construction of an Alaskan natural gas pipeline.

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[14](...continued)
Background and Issues. Updated June 11, 2002. USGS. Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998. USGS Fact Sheet FS-04-98. May 1998.

[15] U.S. Energy Information Administration. Annual Energy Outlook 2002, p. 81. DOE/EIA-0383(2002). December 2001.

Table 2. NPRA vs. ANWR Oil Potential (technically recoverable oil)

	Oil (billion bbl)			
	F_{95}	Mean	F_{05}	Size of area, million acres
Entire area[1]				
ANWR 1002 area	5.7	10.4	16.0	1.9
NPRA	6.7	10.6	15.0	24.2
Federal area only				
ANWR 1002 area	4.3	7.7	11.8	1.5
NPRA	5.9	9.3	13.2	22.5

Note: F_{95} = 95% probability; F_{05} = 5% probability.

[1] Includes federal and native lands and state offshore areas.

Source: United States Geological Survey. Fact Sheet 045-02. U.S. Geological Survey 2002 Petroleum Resource Assessment of the National Petroleum Reserve in Alaska (NPRA).To see entire document: http://geopubs.wr.usgs.gov/fact-sheet/fs045-02/fs045-02.pdf.

The USGS believes that most of the oil is located in the "northern third" of the NPRA, and that it is distributed in "accumulations of moderate size. It is unlikely," continues the USGS, "that a Prudhoe Bay-size accumulation occurs in NPRA."[16] Based upon its estimates of field sizes, the number of accumulations in various size classes, and the possibility that some accumulations may be farther from existing infrastructure than in ANWR, the USGS also concluded that recovery from ANWR is economically more attractive at lower prices for oil (see Table 3).[17] "When market prices are below $35/bbl, a larger volume of technically recoverable oil would be economic in the ANWR 1002 area." However, future oil prices are difficult to predict, and predictions cannot take into account the periodic volatility of prices due to external, and sometimes internal events. The USGS goes on to note that "if prices exceed $35/bbl, NPRA and ANWR 1002 would have nearly equal volumes of economically recoverable oil."[18] OPEC has committed itself to maintaining world prices in a range of $22-$28/bbl, and if oil producers believe that commitment to be indicative of any sort of trend, then production from either NPRA and ANWR, or both, could provide a return on investment. The USGS, in making its calculations, offers no prediction of future oil prices.

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[16]Source: United States Geological Survey. Fact Sheet 045-02. U.S. Geological Survey 2002 Petroleum Resource Assessment of the National Petroleum Reserve in Alaska (NPRA).To see entire document: http://geopubs.wr.usgs.gov/fact-sheet/fs045-02/fs045-02.pdf

[17] Ibid., p. 4-5.

[18] Ibid., p. 5.

Table 3. ANWR vs. NPRA Oil Economics: Economically Recoverable Oil [billion bbl] [2001 constant dollars]

Market price, $/bbl	NPRA	ANWR
15-19	0	0
20	0	3.2
21	0.4	4.0
22	1.3	4.4
23	2.8	5.0
24	3.1	5.2
25	3.7	5.6
26	4.0	5.8
27	4.8	6.0
28	5.1	6.2
29	5.4	6.3
30	5.6	6.3
35	6.4	6.6
40	6.9	6.8

Source: U.S. Geological Survey.

While Table 3 is limited to a comparison of the relative economics of oil production from NPRA and ANWR at various prices, any policy decision on the future of ANWR – relative or not to the NPRA – will likely turn on a number of broad policy issues.

Policy Implications

The newest assessment of the NPRA by the USGS comes at a time when Congress appears sharply divided over whether to open up ANWR to leasing and exploration. The House-passed version of an omnibus energy bill, H.R. 4, would allow oil and gas leasing in ANWR but limit the footprint of development to 2,000 acres of the Coastal Plain.[19] The Senate-passed version of H.R. 4 contains no ANWR development provision. During debate on the Senate version of the energy legislation, the Senate essentially rejected ANWR development on a cloture motion (46 yeas, 54 nays) to break a filibuster of a pro-development amendment. The amendment was subsequently withdrawn, and it is one of the more controversial issues to be addressed by the House and Senate conferees as they deliberate to craft a mutually acceptable version of omnibus energy legislation. In the current debate, some may argue that the revised USGS estimates and ongoing exploration and

[19] Some have argued that there has been very little specificity about how this restriction will be applied, and that full development of ANWR would be impossible unless the infrastructure were scattered. The language does not preclude the dispersal of facilities, and may not apply to Native lands within the NPRA. See CRS Issue Brief IB10094, Arctic National Wildlife Refuge: Legislative Issues.

development in NPRA make opening up ANWR less urgent. However, there is no inherent irreconcilability between ANWR and NPRA, and nothing to preclude making it a matter of policy to develop both areas.