

Senator Murkowski's Arctic Refuge Directional Drilling Production Claims Exceed Generally Recognized Estimates of Arctic Refuge Production Potential, But Lack Credible Geotechnical Support

March 31, 2009

Prepared for the Alaska Wilderness League

by

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Executive Summary

Senator Lisa Murkowski's estimates of possible oil and gas production from her proposal to access unspecified areas in the western portion of the Arctic National Wildlife Refuge by directional drilling from state lands and waters were unsupported by a credible documentary record and at least in part exaggerated. While we believe it is doubtful whether her directional drilling plan can discover and produce oil and gas from the Arctic Refuge Coastal Plain region without significant impacts, the narrower task of this memo is to review the astonishingly weak geotechnical case Senator Murkowski presented to support her claims when she introduced her proposal in press releases Feb. 19 and Feb. 27, 2009. We find it surprising that the senator's office has disclosed that the basis for her directional drilling production estimates was a June 2008 e-mail from a former Interior Department official – a document the senator's office said it did not keep. Subsequent errors in the attempts to defend the senator's proposal, discussed in this report and documented in the attachments, suggest that the senator introduced the bill without first vetting the numbers she was using to insure that her facts and understandings were accurate. For example:

- In attempting to explain the basis for the senator's oil production estimate, the senator's office said it "took into account...the geology of the Kuukpik formation that underlies part of the area." Knowledgeable geologists questioned the relevance of that formation to Arctic Refuge assessments and the senator's office apologized for its mistaken reference to that formation, which is not located on the Arctic Refuge Coastal Plain.
- The senator's office acknowledges that staff did not understand the bases for her original estimates of oil production and now intends to increase that estimate. However, supporting information the senator's staff provided contains a calculating error that results in significant over-estimation of the oil potential of the portion of the Arctic Refuge Coastal Plain under consideration. Any estimate that incorporates this mistake is liable to erroneously over-estimate Arctic Refuge oil production potential.
- Regarding natural gas potential, the senator's office now acknowledges that it will cut its estimate of natural gas that might be discovered and produced through

directional drilling to less than half the amount of natural gas the senator claimed when she introduced her directional drilling plan.

In any event, the best available information on the petroleum potential of the Arctic Refuge Coastal Plain makes clear that whatever quantity of potential oil and gas that might (or might not) be discovered and developed if Senator Murkowski’s directional drilling proposal were enacted would pale in comparison to the U.S. Energy Information Administration’s estimates of the much larger reductions in imported oil between now and 2030 due to conservation.¹

1. Background: Senator Murkowski’s Claims Regarding Arctic Refuge Production Potential from Offshore Directional Drilling Do Not Add Up

When Senator Murkowski announced her plans to introduce federal legislation to access undiscovered oil and gas beneath a small, western section of the Arctic Refuge Coastal Plain by directional drilling from state lands and waters to the Alaska State Legislature Feb. 19, she claimed that new technology will result in production of 1.0 Bbo and 7.0 Tcfg of natural gas, with “no occupancy, no pipelines, building or facilities to impact the refuge or this wildlife.”² Eight days later she introduced the bill, co-sponsored by Alaska Democratic Senator Mark Begich, to the United States Senate.³

The senator’s plan relies on directional drilling, a relatively new technology that has the capacity to extend up to seven miles horizontally underground. Review of trade literature suggests that at these distances, assuring reliable performance is somewhat problematical.⁴ Moreover, this development scheme does not eliminate the need for surface disturbance of the Coastal Plain associated with the effort to find the undiscovered reservoirs this proposal would access later from a remote site. While these

¹ Since 2004 the U.S. Energy Information Administration (EIA) has reduced its domestic import requirement for the period between 2009 and 2030 by 41.9 Bbo due to conservation, compared to potential Arctic Refuge production during the 2009-2030 period of 2.5 Bbo. In other words, conservation’s contribution to the national energy picture between now and 2030 (the last year of EIA’s estimates) outweighs Arctic Refuge drilling by a 17 to 1 ratio. (See: U.S. Energy Information Administration, *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, May 2008 [Report No. SR/OIAF/2008-03; <http://www.eia.doe.gov/oiaf/servicert/anwr/index.html>]; Richard A. Fineberg, *Oil Drilling on the Arctic National Wildlife Refuge Coastal Plain: Economic Perspectives on a Misguided Distraction from the Nation’s Energy Crisis* [prepared for the Alaska Wilderness League] Jan. 22, 2009; and Attachment A.)

² Sen. Lisa Murkowski (press release), “Murkowski Proposes Directional Drilling to Tap ANWR’s Oil and Gas Reserves,” Feb. 19, 2009 (see Attachment B).

³ Sen. Lisa Murkowski (press release), “Murkowski Introduces ANWR Directional Drilling Legislation,” Feb. 27, 2009 (see Attachment B).

⁴ For general background on directional drilling and its application to the Arctic Refuge, see: E. Lidji, “Murkowski: directional wells at ANWR – In the latest attempt to open area to drilling, senator announces bill to drill ANWR from state lands or waters outside the area,” *Petroleum News*, March 1, 2009; Craig Reudenrich, Ph.D., “How ANWR Works,” undated (circa Oct. 30, 2008?), (“How Stuff Works,” <http://science.howstuffworks.com/anwr.htm/printable>); and “Drilling Site,” Dec. 30, 2008 (<http://drillingnow.com/about-drilling/offshore-drilling/>).

issues require careful review, the narrower purpose of this memorandum is to assess the geotechnical basis for Senator Murkowski’s oil and gas production claims regarding the oil and gas that might be produced by directional drilling from state lands and waters to the west and north of the Arctic Refuge Coastal Plain itself.

The seminal source of information on the petroleum potential of the Arctic Refuge region is a three-year study by the U.S. Geological Survey (USGS). Completed in 1998, the entire report was released in a two-volume CD the following year.⁵ Additionally, members of the original survey team have published numerous reports that provide insight into the project findings.⁶ According to the USGS analysis, the Arctic Refuge Coastal Plain region holds a mean estimate of approximately 10.4 billion barrels of undiscovered technically recoverable oil (hereinafter Bbo) and 8.6 trillion cubic feet of natural gas (hereinafter Tcfg).⁷ Of these estimated amounts, the federal “1002” area if the Arctic Refuge Coastal Plain is estimated to hold approximately 7.7 Bbo of oil and 7.0 Tcfg.⁸

On cursory review, Senator Murkowski’s production estimates claims did not comport with USGS estimates of the oil and gas potential of the Arctic Refuge Coastal Plain. Although the senator did not specify a directional drilling base,⁹ her staff later disclosed its assumption that only 80 square miles of land could be reached by using directional drilling from outside the borders of the Coastal Plain.¹⁰ This meant that Senator Murkowski, without providing analysis or supporting data, was assuming that 3.4% of the federal 1002 area would provide 13% of that subregion’s oil and all of its natural gas.¹¹

⁵ U.S. Geological Survey, *The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis* (2-disc CD, summarized in USGS Fact Sheet FS-028-01, April 2001 <http://pubs.usgs.gov/fs/fs-0028-01/fs-0028-01.pdf>).

⁶ For example, in 2002, study team members E.D. Attanasi and J.H. Scheunemeyer noted that the three-year study virtually extinguished hopes that a super-giant field like Prudhoe Bay was likely to be discovered on the Arctic Refuge Coastal Plain, but that the region’s recoverable oil would be found in a large number of significantly smaller fields. Emil D. Attanasi and John H. Schuenemeyer, *Frontier Areas and Resource Assessment: The Case of the 1002 Area of the Alaska North Slope*, USGS Open-File Report 02-119, March 2002, p. 10.

⁷ John H. Scheunemeyer, “Aggregate summary of resource estimates,” in *The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis*, “Assessment Results” (Ch. RS [Table 14]). See also: David W. Houseknecht and Kenneth J. Bird, “Estimated mean volumes of undiscovered, technically recoverable petroleum in conventional accumulations in the Arctic Alaska Petroleum Province,” in *Oil and Gas Resources of the Arctic Alaska Petroleum Province* (U.S. Geological Survey Professional Paper 1732-A), 2006 (p. 9 [Table 4]).

⁸ “Aggregate summary of resource estimates.”

⁹ In her announcement of the proposal to the Alaska State Legislature she spoke of directional drilling from an offshore facility like the Endicott man-made island in the nearshore waters of the Beaufort Sea, east of Prudhoe Bay. (“Murkowski’s speech to the legislature,” *Anchorage Daily News* (Alaska Politics blog), Feb. 19, 2009. (<http://community.adn.com/adn/node/138177>))

¹⁰ E-mail from Robert Dillon (Republican Communications Director, Senate Committee on Energy and Natural Resources) to Richard Fineberg, March 11, 2009 (see Section 2 and Attachment C, below).

¹¹ Calculated as follows:

Percentage of 1002 Area reached by directional drilling: 1,5000,000 acres / 640 – 2,343 sq. miles. 80 / 2343 = 3.4%.

Est. percentage of oil v. obtained by directional drilling v. 1002 area (Bbo): 1.0 / 7.7 = 13.0%.

Est. percentage of natural gas v. obtained by directional drilling v. 1002 area (Tcfg) 7.0 / 7.0 = 100%.

While it is enticing to imagine that the discovery of fields to the west of the Arctic Refuge might be replicated within the Arctic Refuge Coastal Plain region itself, it should be noted in this regard that geologic formations beneath the surface of the earth are discontinuous. The necessary conditions for an oil or gas field to exist may be present in one place, but a few miles away the earth’s composition may have changed and critical components may no longer be present. To cope with this complex reality, geologic play assessments typically assess the likelihood that a rock structure or play may hold oil or gas but do not identify the precise location within that structure where that estimated oil or gas be found.¹² In light of these uncertainties, USGS Arctic specialist Kenneth Bird says he would not feel comfortable assigning specific oil and gas volumes to a small sector at the western edge of the Arctic Refuge Coastal Plain.¹³ Moreover, even when a geologic formation appears promising, that doesn’t mean explorers will necessarily hit oil or gas – or, if they do, that they will find it in sufficient volumes to enable economic production.¹⁴

2. Investigation of the Basis for Senator Murkowski’s Claims Regarding Arctic Refuge Directional Drilling Production Potential

2A. Senator Murkowski’s Peculiar Oil Estimates

In response to a request for more detailed information about the basis for the numbers she is using, responded that said the senator’s directional drilling production estimates were received by the senator in June 2008 by former Interior BLM Assistant Director and Alaska Regional Director Henri Bisson, after internal consultations, in an e-mail response to a request from the senator. According to the senator’s staff,

. . . . [W]e did not keep the email. . . . [which] did not contain the exact technical data for how the estimate was developed, except to say it was based not on the USGS procedures, but took into account the likely geology of the northwest corner of the ‘1002’ area and the geology of the Kuukpik formation that underlies part of the area.”¹⁵

Knowledgeable geologists told me they knew nothing about a Kuukpik formation on the Arctic Refuge Coastal Plain; Arctic specialists at the USGS and EIA advise that they were not involved in generating the Interior Department estimates, which they had neither seen nor reviewed. Additionally, in initial inquiries were unable to learn anything about the basis of the Interior Department estimates of the former Interior Department official that Senator Murkowski used in her press releases of Feb. 19 and Feb. 27.¹⁶

¹² For a brief review of some of the critical factors, see the box on charges, reservoirs and traps in *The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis*.

¹³ Personal communication, March 5, 2009.

¹⁴ Examples of both types of disappointments found on the North Slope include the case of Mukluk, said to be the most expensive dry hole in history, and Badami, a discovery that went into production but failed to live up to its billing.

¹⁵ E-mail from Robert Dillon to Richard Fineberg, March 4, 2009 (see Attachment C).

¹⁶ Personal communications, Mar. 4-5, 2009.

Accordingly, on March 5 we asked again for more substantive information. Senator Murkowski’s office responded on March 11:

. . . . We do apologize for mentioning the Kuukpik formation in our initial response to you. That formation, which does contain oil signs, is located farther to the west away from the border of the refuge.¹⁷

Although the senator’s office described its estimates of oil produced from directional drilling as “quite conservative,” the Senator’s interpretation of USGS base numbers contained a simple mathematical error that resulted in a ten-fold overstatement of oil potential of the portion of the Arctic Refuge Coastal Plain that could be accessed by Senator Murkowski’s directional drilling proposal. According to Senator Murkowski’s office:

The report “Alaska North Slope Oil and Gas, A Promising Future or an Area in Decline,” published by the National Energy Technology Laboratory at Golden, Colo. in August 2006, predicted that ANWR’s coastal plain will produce 5,475 barrels per acre on a mean case basis, which would equal 2.803 billion barrels of oil just from the lands within 8 miles of the western border of the refuge. (Page ES-8) [As we compute the acreage there is about 80 square miles that can be accessed given current directional drilling on the western border of the refuge....¹⁸

In fact, the simplified estimating method that Senator Murkowski’s office decided to use would result in an estimated 0.2803 Bbo of oil produced – one-tenth of the oil the Senator’s office erroneously calculated as attributable to directional drilling at the west end miles of the western border of the refuge that can be accessed by directional drilling.¹⁹

2B. Senator Murkowski’s Erroneous Natural Gas Estimate

In response to the inquiries of March 2 and March 5, Senator Murkowski’s office re-examined its original estimate and intends to reduce the Senator’s original estimate of natural gas production from directional drilling the western sector of the Arctic Refuge Coastal Plain region by more than half. According to the Senator’s staff:

On gas, while the total gas on federal lands in the refuge is estimated at 7.12 trillion cubic feet, probably where the Benini [Interior Department] estimate came from, the non-associated gas in the undeformed area is just .360 trillion cubic feet, while the associated gas is listed at 3.06 trillion cubic feet. Given this exercise, we will change our materials to cut our gas estimates from the northwest corner of the refuge to less than 3.3 trillion cubic feet, less than half, not 80% of the refuge’s total likely gas content. We thank you for calling these data discrepancies to our attention.²⁰

¹⁷ Dillon to Fineberg, March 11, 2009.

¹⁸ Dillon to Fineberg, March 11, 2009.

¹⁹ $5,475 \times 640 \times 80 = 280,300,000$ barrels, or 0.2803 Bbo.

²⁰ Dillon to Fineberg, March 11, 2009.

The senator’s office did not explain the geological basis for its revised figure or how much less than 3.3 Tcfg (the energy equivalent of approximately 0.6 Bbo) the revised estimate would be.

2C. Additional Numbers Concerns

In her Feb. 27 press release, Senator Murkowski mis-stated the range of Arctic Refuge Coastal Plain region production estimates by presenting the mean and 5-percentile estimates (10 to 16 Bbo).²¹ These estimates omitted the low-end counterpart of outlier 16 Bbo estimate (the 95-percentile estimate of 5.7 Bbo), resulting in an exaggerated impression of the USGS estimate of the Arctic Refuge region petroleum resource base.

3. Conclusions

This memo summarizes background information on Senator Murkowski’s putative estimates regarding oil and gas production that might be obtained through offshore-to-onshore directional drilling near the far northwest corner of the Arctic Refuge Coastal Plain region. As discussed above, Senator Murkowski’s original estimates that 1.0 Bbo and 7.0 Tcfg might be obtained through this scheme run counter to the established body of knowledge on potential Arctic Refuge petroleum resources in fundamental respects and lack the support of a credibly documented record. The senator’s original estimates of the oil and gas that might discovered and produced from the western section of the Arctic National Wildlife Refuge Coastal Plain appear to be mathematically and geographically improbable, inconsistent with geologic methodology and either unsupported by the three-year analysis by USGS (in the case of oil) or contradictory to that study (natural gas).

As discussed in Section 2, three items in the attached communiqués demonstrate that Senator Murkowski and her staff would have been wise to examine more closely the numbers she has employed to advocate her directional drilling proposal. Salient errors in Senator Murkowski’s presentations include:

- over-statement of estimated natural gas production estimates from the western portion of the Arctic Refuge Coastal Plain;
- a mathematical mistake that would result in a ten-fold over-estimate of potential oil production from the western sector of the Arctic Refuge Coastal Plain that could be accessed by her directional drilling proposal;²² and
- erroneous reference to the Kuukpik formation.

We believe that errors such as these typify the tendency of development advocates to seize on obscure information and remote possibilities inherent in petroleum assessments instead of performing the kind of objective analysis that is essential to balanced and well-informed public policy analysis. (Unfortunately, corrections to the

²¹ “Murkowski Introduces ANWR Directional Drilling Legislation.”

²² As noted in Section 2B, Senator Murkowski’s office has acknowledged the over-estimate of natural gas; we advised the senator’s office of the third mistake March 12 (see Attachment C) but have not yet heard from the senator’s office.

estimates Senator Murkowski released Feb. 27 with her directional drilling bill are unlikely to catch up with her original numbers, which were widely reported.)

Based on the preceding information, it is clear that Senator Murkowski departed from the established USGS Arctic Refuge information base. Moreover, she apparently did so without conducting a careful review of her apparently exaggerated oil and gas production estimates, which her staff now plans to modify. We would not like to think that Senator Murkowski and her staff treat critical numbers and the complex realities of geology so casually because their principal interest in introducing this legislation “[t]o get ANWR back on the table.”²³ In any event, whatever the senator’s intent may be, the three mistakes by the senator and her staff documented in this memorandum and its attachments demonstrate that the senator would have been well advised to gather, review, understand and document the basis for her proposal *before* going public, instead of afterwards. Her mistakes create confusion, handicapping rational, fact-based public dialogue about the Arctic Refuge. When that confusion is penetrated, it becomes clear that whatever quantity of potential oil that might (or might not) be discovered and developed by Senator Murkowski’s directional drilling proposal would pale in comparison to the U.S. Energy Information Administration’s estimates of the much larger reductions in imported oil between now and 2030 achieved by conservation.

²³ See: “Murkowski’s speech to the legislature.”

List of Attachments

Attachment A. Reduced Imports through Conservation Since 2004 v. Arctic Refuge Production Potential, 2009 - 2030

- The Demonstrated Delivery Power of Oil Conservation v. Potential Arctic Refuge Oil Production, 2009 - 2030

Attachment B. Senator Murkowski's Press Releases (Feb. 19 and Feb. 27, 2009)

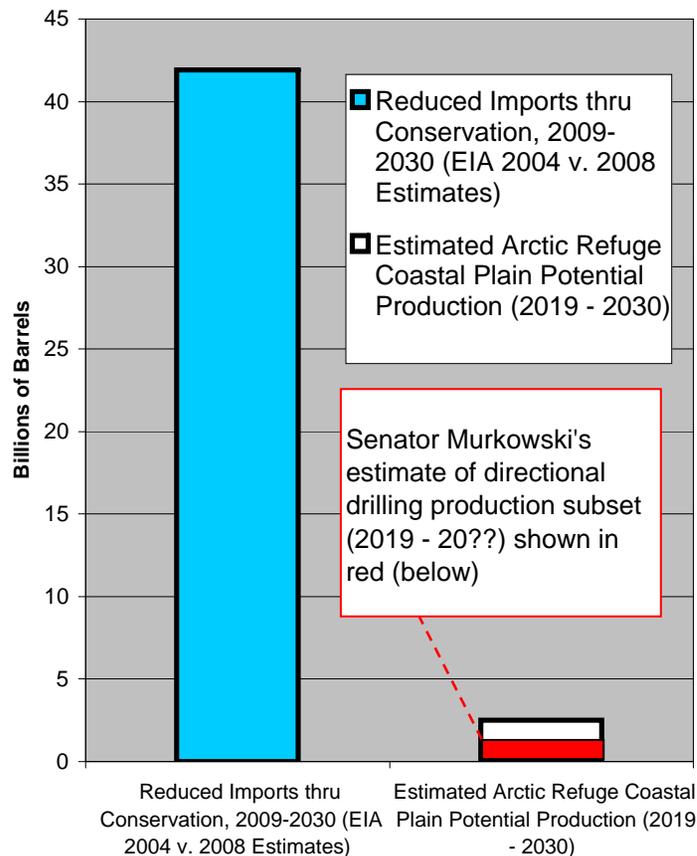
- "Murkowski Proposes Directional Drilling to TAP ANWR's Oil and Gas Reserves" (press release), Feb. 19, 2009
- "Murkowski Introduces ANWR Directional Drilling Legislation" (press release), Feb. 27, 2009

Attachment C. Record of inquiry between Richard Fineberg and Robert Dillon (Republican Communications Director, Senate Energy and Natural Resources Committee):

- Initial inquiry (Fineberg to Robert Dillon), March 2-3, 2009
- Email response (Robert Dillon to Fineberg), March 4, 2009
- Second inquiry (Fineberg to Robert Dillon), March 5, 2009
- Email response (Robert Dillon to Fineberg), March 11, 2009
- Arctic Refuge Directional Drilling Proposal (Third Round) – (Fineberg to Robert Dillon), March 12, 2009

The Demonstrated Delivery Power of Oil Conservation v. Potential Arctic Refuge Oil Production, 2009 - 2030

Compared to its 2004 estimate, the current U.S. Energy Information Administration (EIA) long-term reference case energy forecast shows a 41.9 billion barrel reduction in U.S. estimated oil imports between 2009 and 2030 due to reduced consumption. This reduction (blue bar at left in chart below) dwarfs the 2.5 billion barrels of oil that EIA estimates might be produced between now and 2030 from the Arctic National Wildlife Refuge Coastal Plain region by a factor of approximately 17 to 1 (white bar at right, below) by a factor of approximately 17 to 1, **or, in the case of Sen. Murkowski's directional drilling proposal, nearly 42 to 1 (red bar below right)?**



Imported oil fills the gap between the demand for oil and domestic production. After a decade of rising oil prices, people began curbing their seemingly insatiable demand for oil, resulting in the extraordinary drop in imports (summarized above and charted at left). Despite headlines and anguish about dependence on foreign oil, international tensions that swirl around oil production centers from Russia to the Middle East and Africa and the potential effects of fossil fuels on climate change, this significant change in the nation's petroleum landscape has gone largely unnoticed. (The 41.9 billion barrels of reduced forecast oil demand EIA anticipates between 2009 and 2030 also far outpaces the estimated gains from alternative technologies and conventional production during the same period, which EIA expects to reduce the nation's import requirement for 2009-2030 by another 13.4 billion barrels.)

Meanwhile, analysts warn that the sudden decline in oil prices during the last half of 2008 has reduced available capital resources, ending a giddy oil boom and rendering this nation even more vulnerable to future oil price spikes when global oil demand rebounds.

Does it make sense to tie up scarce resources in the hunt for more petroleum, binding the nation to the wheel of international tensions, potential climate change problems and the boom and bust cycles that characterize oil development? Or should this nation continue on the conservation path, which has demonstrated, over the last five years, the potential to deliver 17 barrels of oil in reduced imports for every one barrel of oil that might be discovered and produced from the Arctic Refuge Coastal Plain region between now and 2030?

Sources -- U.S. Energy Information Administration, *Annual Energy Outlook 2005* (Current [Oct. 2004] Futures Case), *Annual Energy Outlook 2009* (early release), Table 11 and *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge* (May 2008), p. 8. (For additional background and data summary, see: R.A. Fineberg, *Oil Drilling on the Arctic National Wildlife Refuge Coastal Plain: Economic Perspectives on a Misguided Distraction from the Nation's Energy Crisis*, [report to the Alaska Wilderness League, Jan. 22, 2009], Figures 5 and 6.)

Attachment B.

Senator Murkowski's Press Releases (Feb. 19 and Feb. 27, 2009)

- **“Murkowski Proposes Directional Drilling to TAP ANWR's Oil and Gas Reserves” (press release), Feb. 19, 2009**
- **“Murkowski Introduces ANWR Directional Drilling Legislation” (press release), Feb. 27, 2009**

NEWS FROM THE OFFICE OF

SENATOR LISA MURKOWSKI
United States Senate



MURKOWSKI PROPOSES DIRECTIONAL DRILLING TO TAP ANWR'S OIL AND GAS RESERVES

Thursday, February 19, 2009

WASHINGTON, D.C. - U.S. Senator Lisa Murkowski, R-Alaska, speaking today during her seventh annual address to the Alaska Legislature, urged change in the way Americans approach energy production in Alaska.

Murkowski said she plans to introduce legislation that will allow oil from the Arctic National Wildlife Refuge (ANWR) to be developed initially using only directional drilling techniques and no surface occupancy of ANWR. This legislation would take advantage of the vast technological improvements in underground oil development to allow oil under the refuge to be siphoned from state land based production platforms.

"If we drill from state lands and waters, there will no occupancy, no pipelines, building or facilities to impact the refuge or this wildlife," Murkowski said. "America will get the energy it needs and those concerned about the impact to wilderness will be able to enjoy and preserve the refuge exactly as it is today. It is the best of both worlds."

Murkowski noted that current directional drilling technology would only permit about 10 percent of the refuge's estimated oil and 80 percent of its natural gas to be produced, but future subsurface oil technology may well substantially increase those percentages. She said the advantage of her new proposal is that drilling from state lands will allow oil production to begin sooner, and that Congress has already approved the "no surface occupancy" precedent in development of a wilderness area when it approved the Wyoming Range Legacy Act of 2007, the first bill to permit underground oil development form beneath a wilderness area.

"I ask the new administration to approach this conversation over ANWR with an open mind," Murkowski said. "We have an innovative, brand-new approach to energy production. I urge those opposed to development in ANWR to take a close look at my proposal - it will not harm ANWR's tundra or ecosystem or the Porcupine caribou herd which does not travel on state lands."

Accessed Mar. 2, 2009 at:

http://murkowski.senate.gov/public/index.cfm?FuseAction=PressOffice.PressReleases&ContentRecord_id=9041f4fa-d1d0-cd71-81c0-edd4b1bb3ab6

NEWS FROM THE OFFICE OF

SENATOR LISA MURKOWSKI
United States Senate



MURKOWSKI INTRODUCES ANWR DIRECTIONAL DRILLING LEGISLATION

Friday, February 27, 2009

WASHINGTON, D.C. - U.S. Sen. Lisa Murkowski, R-Alaska, today introduced legislation that would allow the use of advanced directional drilling to tap the vast energy potential of the Arctic National Wildlife Refuge coastal plain without disturbing the unique characteristics of the area.

The bill, co-sponsored by Sen. Mark Begich, D-Alaska, would allow access to the coastal plain's oil and natural gas resources through the use of underground directional drilling from state-owned lands to the west of the refuge and state waters from the north.

"Everybody wins with this bill - America improves its energy security and the conservation community is ensured that there will be no visible impact on the refuge," Murkowski said. "I urge those previously opposed to oil and gas exploration in ANWR to take a fresh look at this issue and show a willingness to compromise."

The legislation seeks to find a compromise with those groups concerned with preserving the 1.5 million acre coastal plain while recognizing the need to improve our energy security and economy by meeting more of our energy needs with domestic production.

"Directional drilling provides a great opportunity to tap the Arctic refuge's vast oil and gas potential with minimal disruption to the wild lands and the wildlife which depend on them," Begich said. "I have been a long-time supporter of this cutting-edge technology and am hopeful this measure will help lead to an informed discussion about how to address America's energy needs and how Alaska can help meet them. Developing the enormous energy resources on Alaska's North Slope should be part of a comprehensive national energy policy which also includes renewable energy and conservation."

Begich added that he appreciates Murkowski's leadership on this issue as she steers the legislation with her ranking position on the Senate Energy and Natural Resources Committee.

Directional drilling would allow energy companies to reach oil deposits up to eight miles away with no surface occupancy in the refuge. Production platforms on state lands and waters would be far away from the calving areas most used by the Porcupine caribou herd that visits the coastal plain in summer.

The bill is based on the successful compromise reached in the Wyoming Range Legacy Act of 2007, which permitted resources to be accessed underground through directional drilling in a new wilderness area as long as there was no permanent surface impacts.

Revenue raised from development of ANWR would be distributed evenly between the state and federal treasuries. The bill also includes \$15 million of mitigation impact aid to North Slope residents. A portion of the federal proceeds would also be dedicated to renewable energy, energy efficiency and wildlife habitat and mitigation programs nationwide.

Development of the coastal plain could create as many as 700,000 new high-paying jobs and provide badly needed revenue - as much as \$112 billion in royalties, lease payments and corporate taxes - for the nation's new energy priorities.

The Department of the Interior estimates that more than 1 billion barrels of oil and 7 trillion cubic feet of natural gas are available within eight miles of the western edge of ANWR, and are reachable through directional drilling. While this represents just 10 percent of the oil and about 80 percent of the gas estimated to be contained beneath the refuge, future advances in directional drilling technology will allow companies to capture an ever increasing amount of the area's resources.

The U.S. Geological Survey estimates the ANWR coastal plain contains between 10 billion and 16 billion barrels of oil, and 8.6 trillion cubic feet of natural gas - making it the largest undeveloped onshore conventional oil deposit in North America.

Accessed Mar. 2, 2009 at:

http://murkowski.senate.gov/public/index.cfm?FuseAction=PressOffice.PressReleases&ContentRecord_id=b8a85b1c-0436-3011-7f91-7d15863db0b0&Region_id=&Issue_id=

Attachment C.

**Record of inquiry between Richard Fineberg and Robert Dillon
(Republican Communications Director, Senate Energy and Natural
Resources Committee):**

- **Initial inquiry (Fineberg to Robert Dillon), March 2-3, 2009**
- **Email response (Robert Dillon to Fineberg), March 4, 2009**
- **Second inquiry (Fineberg to Robert Dillon), March 5, 2009**
- **Email response (Robert Dillon to Fineberg), March 11, 2009**
- **Arctic Refuge Directional Drilling Proposal (Third Round) –
(Fineberg to Robert Dillon), March 12, 2009**

From the desk of

Richard A. Fineberg

P.O. Box 416, Ester, Alaska 99725

Phone / Fax (907) 479-7778 • E-mail: fineberg@alaska.net

Via e-mail to: Robert_Dillon@energy.senate.gov

To: Robert_Dillon

Date: March 2, 2009

Re: Arctic Refuge Directional Drilling Questions

I am trying to obtain substantive information on the numbers and the geological and logistical bases for the proposal to access the Arctic National Wildlife Refuge using offshore-to-onshore directional drilling. Specifically, I am looking for the following sources and information:

1. 1.0 Billion Barrel Production Estimate
 - A. When, where and on what basis did the Interior Department report that offshore directional drilling could yield 1.0 billion barrels of crude oil (approximately one-tenth of the USGS mean technically recoverable figure of 10.5 billion barrels)?
 - B. In order to help reviewers understand how Interior came up with this estimate, can you provide the agency report?
2. 1.0 Million Barrel Per Day Production Peak after 2025
 - A. When, where and on what basis did Interior publish this estimate?
 - B. In view of the logistical difficulties associated with both northern and offshore development, is it reasonable to expect the potential production cited by Sen. Murkowski can be delivered in the same time frame as onshore production without delaying the onset of onshore production? (Or would the directional drilling replace on-shore production altogether?)
 - C. How many years does Senator Murkowski (or the Interior Department) estimate that this operation would remain in production?
3. Physical Factors
 - A. Would offshore drilling be conducted from natural islands man-made islands or drill ships?
 - B. Have any of the potential production sources been discovered?
 - C. Can you provide estimates of the breakdown between offshore production on state and/or federal territory and onshore on federal lands?
 - D. Has a particular site been selected?
 - E. If so, can you identify the plays (or other geological structures) associated with the designated sites?)
4. Price of Oil Necessary to Sustain Production
 - A. Did the Interior Department provide (or did Senator Murkowski identify) the minimum oil price figure necessary to sustain production from this remote site? (If so, please indicate whether these figures are in nominal or real dollars.)
5. Natural Gas Production:
 - A. What is the basis for the estimate of 7.0 TCF of the USGS natural gas or 80% of total Arctic Refuge Coastal Plain mean technically recoverable might be discovered and produced?

- B. In order to help reviewers understand how Interior came up with this estimate, can you provide the agency report?

Thanks, Robert.

From: Dillon, Robert (Energy) [mailto:Robert_Dillon@energy.senate.gov]
Sent: Wednesday, March 04, 2009 6:21 AM
To: 'Richard Fineberg'
Subject: RE: Questions Re: Arctic Refuge Directional Drilling Proposal

Richard,

I've attached the answers to your ANWR questions. Please feel free to contact me if you have any additional questions.

Best,

Robert Dillon
Senate Energy and Natural Resources Committee

*From the desk of **Richard A. Fineberg***
P.O. Box 416, Ester, Alaska 99725
Phone / Fax (907) 479-7778 ° E-mail: fineberg@alaska.net

Via e-mail to: Robert_Dillon@energy.senate.gov

To: Robert_Dillon Date: March 2, 2009

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I am trying to obtain substantive information on the numbers and the geological and logistical bases for the proposal to access the Arctic National Wildlife Refuge using offshore-to-onshore directional drilling. Specifically, I am looking for the following sources and information:

1. 1.0 Billion Barrel Production Estimate

A. When, where and on what basis did the Interior Department report that offshore directional drilling could yield 1.0 billion barrels of crude oil (approximately one-tenth of the USGS mean technically recoverable figure of 10.5 billion barrels)?

Senator Murkowski asked the Bureau of Land Management in early June 2008 for an estimate of production that could be produced within 8 miles of just the western border of ANWR that could be produced from state-owned lands just outside the boundary of the refuge. By email the BLM's Assistant Director and former Alaska Regional Director Henry Bisson after internal consultations responded the Department's staff had estimated that 1.23 billion barrels and 7 trillion cubic of natural gas could be produced using directional drilling technology. Being conservative, the Senator used that estimate and did not include any oil or gas from other traps located within 7 miles of the northern coast of the refuge only oil no less than eight miles from the border in predicting the bill's potential production initially.

B. In order to help reviewers understand how Interior came up with this estimate, can you provide the agency report?

No we did not keep the email reply to last summer's inquiry, but the reply did not contain the exact technical data for how the estimate was developed, except to say it was based not on the USGS procedures, but took into account the likely geology of the northwest corner of the "1002" area and the geology of the Kuukpik formation that underlies part of the area.

2. 1.0 Million Barrel Per Day Production Peak after 2025

When, where and on what basis did Interior publish this estimate?

We are confused by your reference since the Senator did not in her introduction of the bill or her legislative speech site a 1 million barrel per day production level for production from ANWR without surface development that is not permitted by her bill. As you know the U.S. Geological Survey has made estimates of production for the 1002 area, recently updated in USGS Professional Paper 1732-A published in 2005. If you base estimates on that paper and assume the high case estimate that the refuge contains 16 billion barrels, you reach a level of production in excess of 1.1 million barrels a day by 2025. The actual 1 million estimate, if we had said it, would be supported by the Energy Information Administration's ANWR Alternative Oil Case estimates, page 94 of the agency's Annual Energy Outlook 2006. In that paper EIA said that if ANWR did come in at 16 billion barrels, the high-case forecast, the field could produce between 1 million and 1.58 million barrels per day in 2024.

How many years does Senator Murkowski (or the Interior Department) estimate that this operation would remain in production?

--The Senator did not make such a prediction, but there are three scenarios that you have seen, the 1987 EIS, the U.S.G.S. hypothetical field production scenario and the Energy Information Administration production scenario in 2002 and updated in 2006. They vary between 30 and 40 years for field life depending on speed of exploration, price, distance within the 1002 area to TAPS and on basic assumptions on market conditions

3. Physical Factors

A. Would offshore drilling be conducted from natural islands man-made islands or drill ships?

Assuming you are referring to production and not exploratory drilling, this would probably depend upon variables including the location of the structures and their respective quantities, as well as the comparative state and federal regulatory and economic preferences for the most practical deployment of the directional drilling technology.

B. Have any of the potential production sources been discovered?

Other than the existing 2D seismic surveying that took place in the early 80's and the one exploratory test well, we are aware of no production "discoveries" inside the "1002" area. The USGS surveys are generally available from USGS and the exploratory well information is proprietary.

C. Can you provide estimates of the breakdown between offshore production on state and/or federal territory and onshore on federal lands?

We are uncertain of your question. All production will underlie the lands of the Arctic coastal plain. If your question is how much will be produced from land-based production wells versus off-shore based wells, whether on a platform, or a man-made gravel island, like Endicott, our initial estimates of production are solely on land-based production.

D Has a particular site been selected?

Obviously not in details since this will require a joint effort between the State of Alaska and the Department of Interior and two agencies BLM and MMS, similar to the coordination for the Joint State-Federal Beaufort Sea Lease Sale of the early 1980s. No site for well pad location can be selected without that consultation, but the leasing would be of areas that can be accessed by technology that does not permit permanent surface occupancy of the coastal plain.

E. If so, can you identify the plays (or other geological structures) associated with the designated sites?)

I can only refer you to Chapter 3 page 54 of the Environmental Impact Statement for ANWR production published in 1987 where seismically mapped prospects covering the “1002” area are depicted. USGS in their more recent work has not specified specific prospects using their more recent statistical models for oil and gas production forecast.

4. Price of Oil Necessary to Sustain Production

Did the Interior Department provide (or did Senator Murkowski identify) the minimum oil price figure necessary to sustain production from this remote site? (If so, please indicate whether these figures are in nominal or real dollars.)

We did not ask given that previous economic viability forecasts for ANWR production based estimates of potential production on prices in excess of just \$22 per barrel (West Coast) and prices last summer were nearing \$140 per barrel with the EIA and International Energy Agency forecasts predicting oil prices of at least \$65 a barrel (\$2008) as a minimum when oil would be coming on line. Given existing prices of roughly \$40 per barrel, even at these unlikely to continue relatively low prices, even USGS papers indicate that 90 percent of oil in the refuge is economic to produce.

5. Natural Gas Production:

What is the basis for the estimate of 7.0 TCF of the USGS natural gas or 80% of total Arctic Refuge Coastal Plain mean technically recoverable might be discovered and produced?

The statistic is produced by using the 8.6 trillion cubic feet of gas forecast by USGS from the ANWR 1002 area in a mean case scenario as reported in the, “Oil and Gas Resources of the Arctic Alaska Petroleum Province,” Professional Paper 1732-A, page 9 Table 4 and dividing by the 7 tcf estimate provided by BLM in June 2008.

B. In order to help reviewers understand how Interior came up with this estimate, can you provide the agency report? See answer 1A.

From: Richard Fineberg [mailto:fineberg@alaska.net]
Sent: Tuesday, March 03, 2009 3:49 AM
To: Dillon, Robert (Energy)
Subject: Questions Re: Arctic Refuge Directional Drilling Proposal

Dear Robert:

Can you provide brief answers to the attached questions regarding the numbers and the geological and logistical bases behind the proposal to access the Arctic Refuge Coastal Plain using offshore-to-onshore directional drilling?

Looking forward to your prompt response, I am

Sincerely,

Richard A. Fineberg
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From the desk of

Richard A. Fineberg

P.O. Box 416, Ester, Alaska 99725

Phone / Fax (907) 479-7778 • E-mail: fineberg@alaska.net

Via e-mail to: Robert_Dillon@energy.senate.gov

To: Robert Dillon, Republican Communications Director
U.S. Senate Committee on Energy and Natural Resources

Date: March 5, 2009

Re: Second Round: Arctic Refuge Directional Drilling Questions

Thank you for your response to the questions I posed March 2 regarding Senator Murkowski's proposal to access the Arctic National Wildlife Refuge using offshore-to-onshore directional drilling. I write again because key points about the original questions remain unanswered. To facilitate response, I have maintained the numbering order of my original letter, while attempting to identify points of difference in the indented paragraphs.

1. Basis for Sen. Murkowski's 1.0 Billion Barrel Production Estimate

From your response, I gather that Senator Murkowski did not obtain and does not possess a substantive basis for the e-mail estimate she on which her proposal was based, which was provided to her eight months earlier (in June 2008) by former BLM Assistant Director and former Alaska Regional Director Henry Bisson. You added that the estimate was based on consultation with Interior Department staff and "took into account the likely geology of the northwest corner of the '1002' area and the geology of the Kuukpik formation that underlies part of the area."

- A. I called the Interior Secretary's Alaska office in Anchorage and was forwarded to the BLM Alaska office where, I was told that the staff knew nothing about these estimates; BLM was not able to put me in touch with the Henri Bisson, now retired.
- B. In reviewing the 1998 USGS study of the geology of the Arctic Refuge Coastal Plain, I find:
 - (1) a very different picture of the undiscovered oil and gas resources in that corner of the Arctic Refuge Coastal Plain from that painted by Senator Murkowski; and
 - (2) no Kuukpik formation (nor have my inquiries come up with discussion of a potential oil or gas-bearing Kuukpik formation on the Arctic Refuge Coastal Plain).
- C. The unusual lack of the substantive support for this proposal prompts me to pose this question for Senator Murkowski: Does it serve the public interest to craft a public policy decision on controversial issue on the basis of unsupported information and an e-mail that she no longer exists in your office, from an individual who is no longer in government service?

2. Arctic Refuge Production Peak after 2025

Thank you for clarifying that Senator Murkowski did not use the outdated and tenuous Arctic Refuge production peak of 1.0 million bpd after 2025 in introducing this piece of legislation. Apparently I picked up this piece of misinformation from several of the press articles accompanying her proposal and I apologize for my misreading. At the same time, I must take strong exception to your defense of that figure. You write that "The actual 1 million estimate, if we had said it, would be supported by the Energy Information Administration's ANWR Alternative Oil Case estimates, page 94 of the agency's Annual Energy Outlook 2006. In that paper EIA said

that if ANWR did come in at 16 billion barrels, the high-case forecast, the field could produce between 1 million and 1.58 million barrels per day in 2024.” In response:

- A. Contrary to your statement, since 2006 EIA has been using a much lower reference (base) case estimate of Arctic Refuge production than the figures you referenced. Specifically, in the *2006 Annual Energy Outlook* at p. 94, EIA states, “Oil production from ANWR grows to a peak of 780,000 barrels per day in 2024, then declines to 650,000 barrels per day in 2030.” (By the way, the current EIA reference case peak estimate of 0.78 million bpd is explained clearly in its May 2008 report, *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge* (pp. 3-8).
- B. The EIA reference (base) case peak is less than half the estimates you cited from outdated EIA reports; the high estimates are the result of an outlier (5 percentile, or one-in-twenty possibility) scenario. In the interest of informed discourse, if it is necessary to use an outlier estimates from one end of the scale, usually it is equally important to balance that reference with the opposite outlier from the other end.
- C. Although the Interior Department’s web site still contains occasional references to a maximum 1.0 million bpd production rate, I believe these are also either outdated and/or based on outlier estimates that are inappropriately cited as the basis for broad public policy deliberations.

3. Physical Factors

My questions were aimed at obtaining a better understanding of Senator Murkowski’s proposal. While I appreciate your description of the various pieces of information on which Senator Murkowski is apparently relying, when I put this piecemeal information together, I come up with a very different picture (as noted in my follow-up to Questions 1., above and 5. below).

- A. Without more substantive information, it is a stretch to adopt as a basis for public policy the notion that offshore-to-onshore directional drilling of a tiny corner of the Arctic Refuge Coastal Plain region (comprising less than one-25th of the entire area) can discover, access and produce 1.0 billion barrels of oil, or 10% of the entire area’s estimate technically recoverable mean volume of oil.
- B. In any event, the fraction of this volume of oil that might be produced by 2030 would pale in comparison to the amount of reduced oil imports that EIA data have already demonstrated can (and will) be saved by conservation during the next two decades (*i.e.*, through 2030),

4. Price of Oil Necessary to Sustain Production

I remain concerned that the surprising increase in exploration and development costs since 2005 adversely affects the risks faced by developers and – consequently – the economic viability of this proposal.

5. Natural Gas Production

Sen. Murkowski’s estimate that 7.0 TCF of natural gas could be produced by directional drilling from a tiny offshore area just off the edge of Arctic Refuge Coastal Plain is not supported by available information. Based on inquiries to the people who work in this area at BLM-Alaska, USGS and EIA, it appears that that Sen. Murkowski’s proposal is not based on (1) new information, or on (2) substantive information that would credibly change the existing picture regarding Arctic Refuge oil and gas production potential. I therefore come back to you seeking explanation for the basis of a proposal that is predicated on a radical revision of the thrust of existing information on that potential. Specifically:

- A. USGS posits a total of 8.6 TCF of natural gas throughout the entire Arctic Refuge Coastal Plain, believed to lie in undetermined locations within a 1,500 square-mile swath of the Arctic Coast (approximately half in undiscovered, relatively small natural gas fields and half associated with undiscovered oil fields). The proposal to access the Coastal Plain you have described can reach approximately 55 square miles of land – less than one-25th of the Arctic Refuge Coastal Plain study area. Yet drilling from this corner is somehow supposed to deliver 80% of the entire Arctic Refuge Coastal Plain study area's estimated total mean technically recoverable natural gas. An e-mail (no longer on file) from a former Interior Department official hardly seems to be adequate basis for making this Herculean assumption reversal.
- B. The possibility of this scenario materializing is even less likely when one considers that in its 1998 assessment of the Arctic Refuge, USGS identified five geologic plays (rock structures likely to contain oil and/or gas) that the offshore-to-onshore directional drilling proposal could conceivably reach. Of these five geologic entities, one was deemed non-productive and two were anticipated to yield 90% oil and only 10% natural gas. Moreover, estimated quantities of natural gas for all plays underlying the northwest corner of the Arctic Refuge Coastal Plain did not appear to support discovery of the 7.0 TCF Senator Murkowski says the tiny northwest corner of those formations can produce from undiscovered fields via directional drilling.
- C. Finally, in inquiries to the Interior Dept., USGS and EIA (as well as leaseholders in the proposed offshore drilling area), I have found no substantive information that would support the notion that exploration of the Arctic Refuge Coastal Plain would reverse the thrust of existing geological analyses and historical information with the presumption of discovery of a 7.0 TCF natural gas find in the corner of the Arctic Refuge oil and gas province from which Senator Murkowski advocates drilling.

Thanks for your time and attention, Robert. Any light you can shed on the subjects I have identified here will be greatly appreciated.

From the desk of

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To: Robert Dillon, Republican Communications Director **Date:** March 12, 2009
Senate Energy and Natural Resources Committee

Re: Arctic Refuge Directional Drilling Proposal (Third Round)

Thank you for your response to my March 5 follow-up query. Hope the responses in red below will be of use to you.

From: Dillon, Robert (Energy) [mailto:Robert_Dillon@energy.senate.gov]
Sent: Wednesday, March 11, 2009 7:31 AM
To: 'Richard Fineberg'
Subject: RE: FOLO: RE: Questions Re: Arctic Refuge Directional Drilling Proposal

Hi. Richard, Sorry for my delay in responding, but Chuck Kleeschulte, now of the Energy Committee staff, who helped me compose my responses to some of your inquiries asked for additional time to track down additional information so that there will be no need for additional inquiries.

Concerning your first question, we were more than surprised when you said that no one in the Anchorage BLM office knew where our production estimates came from. We did track down Mr. Bisson, who is retired in the Southwest, and he confirmed once again to us that the estimates of 1.23 billion barrels of oil and 7 trillion cubic of natural gas were developed by the staff of BLM with advice from USGS personnel in the Alaska State field office in Anchorage. We called BLM State Director Tom Lonnie and he had his communications director Sharon Wilson track down who and how the estimates were developed. She discovered that they were crafted by Art Benini, a BLM resource specialist who is currently on personal leave until next week – the end of spring break in Anchorage. A search of his records apparently found some of his work sheets, but frankly, existing office staff are having trouble understanding his exact data interpretations. To other BLM employees and USGS employees at Reston, VA. that we turned to next, it seems that Art was extremely conservative in his oil forecasts but that his natural gas estimates were equally liberal.

RD – Thank you for bringing me up to date on what you discovered this week regarding the basis for the Arctic Refuge oil and natural gas potential production estimates your office has been using since Feb. 19.

(The circumstances you describe probably explain why I was not able to locate the estimating parties when I called the Interior Department offices last week.) In light of the fundamental problems discussed in this response, I continue to question Senator Murkowski's estimates of potential Arctic Refuge oil and gas production from offshore-to-onshore directional drilling. – RAF

USGS officials at Reston, spent Monday trying to understand Art's estimates and urged us to use their estimates in the future that are available in Table RS 14. link <http://pubs.usgs.gov/of/1998/ofr-98-0034/RS.pdf> (.). So in the future we will no longer be so conservative on oil and use their mean case estimate that the undeformed area of the 1002 area at a mean case level will produce not 1.23 billion, but up to 6.420 billion barrels of oil. We will use less than that since underground technology currently does not allow us to access all of the undeformed area. But we will raise our estimates above 1.23 billion barrels, thanks to your inquiry.

RD – The USGS estimate of 6.42 billion barrel estimate of technically recoverable oil estimated to lie beneath the western (“undeformed”) area of the Arctic Refuge Coastal Plain has been recognized since 1998 as an integral part of that agency's mean estimate of total technically recoverable oil from the Arctic Refuge Coastal Plain region. (See, for example, USGS, *Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis*, Fact Sheet FS-028-01, April 2001 [Table 1., Estimates of volumes of technically recoverable oil in various parts of the ANWR assessment study area], <http://pubs.usgs.gov/fs/fs-0028-01/fs-0028-01.pdf>.) Since this estimate was part of the production base on which Senator Murkowski's initial directional drilling production estimates were made, I must admit I am somewhat surprised that this figure now prompts you to increase Senator Murkowski's original estimates. Further, I don't believe this estimate was meant to be applied directly to a small portion of the much larger area of land whose potential USGS was evaluating. For additional methodological reasons discussed below, I still question both Senator Murkowski's original estimates of potential oil production and your stated intent to increase those estimates. In the interest of assuring that we are starting from the same set of facts, please note that the 6.42 billion barrel estimate you are using refers to the USGS estimate of oil in the western (“undeformed”) sector of the Arctic Refuge “1002” area that is TECHNICALLY recoverable. The oil that is ECONOMICALLY recoverable is a price-dependent fraction of that amount. (More on this subject below.) – RAF

On gas, while the total gas on federal lands in the refuge is estimated at 7.12 trillion cubic feet, probably where the Benini estimate came from, the non-associated gas in the undeformed area is just .360 trillion cubic feet, while the associated gas is listed at 3.06 trillion cubic feet. Given this exercise, we will change our materials to cut our gas estimates from the northwest corner of the refuge to less than 3.3 trillion cubic feet, less than half, not 80% of the refuge's total likely gas content. We thank you for calling these data discrepancies to our attention. But the state office will now -- after this exercise -- confirm that they did provide data to answer Mr. Bisson's request, if you call 907/271-5080 and ask for Sharon Wilson.

We certainly reject totally that it was improper for the Senator, joined by new Alaska Senator Mark Begich, to have introduced the legislation based on the estimates relayed to us by the long-time Alaska State Director and until Dec. 31, acting Department of Interior Alaska representative in Washington, and the Assistant BLM director nationally, Henri Bisson. We still hope that once Mr. Benini returns to work next week that he will support the original estimates, but until he does, we will use the higher oil and the lower gas estimates.

We are quite surprised by your comment about the geology of the Arctic Refuge Coastal Plain. The estimates the Senator cited are quite conservative based on U.S. Geological Survey reports. From the open file report 2005-1217 published in 2005 by geologist E.D. Attanasi, you will find on page 4, table 1, estimates that the undeformed area of the "1002" Area, the northwest corner of the refuge contains six plays: Topset, Turbidite, Wedge, Thomson, Kemik and the Undeformed Franklinian that are estimated by USGS to contain 6.420 billion barrels of technically recoverable oil. We do apologize for mentioning the Kuukpik formation in our initial response to you. That formation, which does contain oil signs, is located farther to the west away from the border of the refuge.

RD – I do not agree that your use of the technically recoverable total from the six western "1002" area geologic plays (examined in the USGS 1998 study and listed in E.D. Attanasi's 2005 report) is conservative. When one looks at the USGS maps of these six plays (see Figures AO6 thru AO11 at <http://pubs.usgs.gov/of/1998/ofr-98-0034/AO.pdf>), it is readily apparent that these geologic structures each cover areas far beyond the small corner of the Arctic Refuge Coastal Plain that would be accessed by directional drilling. On review of the information you have provided, I still question the basis for Senator Murkowski's assertion that more than 10 percent of the estimated potential oil the Arctic Refuge Study Area is estimated to hold will come from less than 3 percent of the study area. –
RAF

Concerning your second point, again Senator Murkowski did not say her current bill would produce 1 million barrels a day of production by means of conventional drilling, but there are certainly numerous examples of support for such a statement in the public record.

For example, The Energy Information Administration May 2000 report on ANWR released during the Democratic Clinton Administration, Report SR/O&G/2000-02, estimates peak production rates from ANWR of “up to 1.9 million barrels per day across the six cases” considered. That estimate assumed oil prices of \$22.04 in 1998 dollars.

RD – I remain skeptical about the use of out-of-date estimates one can always find in the public record; their existence doesn't establish their accuracy, or their usefulness. Note in this regard that the dramatic increase in field costs since 2005 function to raise the size and price threshold at which new fields become economically viable. – RAF

The report “Alaska North Slope Oil and Gas, A Promising Future or an Area in Decline,” published by the National Energy Technology Laboratory at Golden, Colo. in August 2006, predicted that ANWR's coastal plain will produce 5,475 barrels per acre on a mean case basis, which would equal 2.803 billion barrels of oil just from the lands within 8 miles of the western border of the refuge. (Page ES-8) [As we compute the acreage there is about 80 square miles that can be accessed given current directional drilling on the western border of the refuge, not the 55 square miles that you cited in your fifth question.]

RD – Even if one accepts your assumptions (which I consider tenuous, particularly because oil usually is not evenly distributed over each acre of a given province), the figures you are using would result in an estimate of 0.2803 billion barrels of oil produced from the 80 square miles at the northwest edge of the Arctic Refuge Coastal Plain 1002 area – one-tenth of the oil you apparently intend to attribute to the lands within 8 miles of the western border of the refuge that can be accessed by directional drilling. ($5,475 \times 640 \times 80 = 280,300,000$ barrels, or 0.2803 billion barrels.) – RAF

And further support for that statement comes from the Environmental Impact Statement for opening of ANWR from 1987, page 55, where you will find three to five of the refuge's 26 geological traps lie within 8 miles of the western border and that nine more traps lie within seven miles of the northern coast line.

RD – It is important to note that for a trap to contain oil, specific geologic conditions must have existed. (Otherwise, a prospect turns out to be a dry hole, or to hold insufficient quantities to sustain economic production.): For example, the formation must have a charge and the trap must be sealed. (For brief discussion, again see *Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis.*) When you pull data from reports done more than a decade apart, it is

important to examine the methodologies used to assure that the assumptions, definitions and protocols in the earlier report are consistent with those of the latter. Have you assured that the 1987 data are compatible with the 1998 USGS report (which provides the quantitative basis for the estimates we are discussing)? – RAF

Chuck Kleeschulte does want me to apologize to you, he did not mean to mislead you when he cited the EIA Energy Outlook 2006 report, page 94 as calling for production of 1 million barrels a day. You are correct that it does cite 780,000 per day in 2024 as peak output. He was looking at both the 2006 and another EIA forecast model run from 2004 prepared for a House member that may not be public at the time he proposed that answer, that did forecast production of from 0.64 for the 95% case to 1.58 million barrels for the 5% case with the mean case being at about 1 million barrels and he simply misstated the date.

Concerning your third point, it is certainly true that conservation can reduce U.S. energy demand, but given that according to the Energy Information Administration's new 2009 Annual Energy Outlook that takes into account future conservation improvements, that this country is expected to be producing just 5.59 million barrels of oil a day in 2030, and still importing 8.8 million barrels per day in 2030 even with the expectation that domestic biofuel production will displace 4 million barrels of imports by then, we would respectfully suggest that it still makes sense for America to produce every barrel of oil that it can, provided it can be done without environmental damage which this proposal will permit. That is especially the case since the EIA current forecast, even without carbon limitation legislation being considered, forecasts that the cost of oil in 2030 will be \$130 per barrel in 2007 dollars or \$189 per barrel in nominal dollars and that the price for gas will be \$9.25 per million BTUs in 2030. These prices are important considerations in response to your fourth and fifth points, which is why your concerns about economics affecting the viability of field development seem misplaced to us.

Concerning your fourth point, you are correct that steel, production and exploration costs have increased substantially since 2005, which is why oil production from the western areas of the "1002" area are likely to make even better economic sense since the infrastructure and pipeline costs to get the oil to TAPS will be considerably lower given the relatively short distance of new line needed and given the substantial excess capacity in TAPS at the time, compared to production from a new production area like NPRA, which has far greater distances to the edge of pipelines that currently terminate near the current Alpine field – assuming that commercial quantities of oil are found in NPRA.

And concerning your points on natural gas, we will use the lower estimates for gas production from an underground bill, even though, when you look at the

gas contents of the Point Thompson field, located just miles west of the western edge of the refuge (7 tcf) and clearly on the west side of the Marsh Creek Anticline, the chances for significant gas discoveries still does still seem possible in the western edge of the 1002 area coastal plain.

RD – If the geologic conditions that created the Pt. Thomson field carried eastward into the Arctic Refuge Coastal Plain, wouldn't the USGS estimate for gas in the western region have been much higher? – RAF

But winter exploration and even production without surface occupancy means that there will be no damage to the refuge and its wildlife by looking for oil and gas, and if the volumes are insufficient gas or oil won't be produced.

RD – I'd be happy to argue this notion with you at a different time. (The narrower purpose of this exchange is to ensure that we bring to the public the best possible understandings of the oil and gas production potential of the Arctic Refuge Coastal Plain region.) – RAF

Sorry for the delay in responding but the folk we needed to talk to at BLM in Anchorage were unavailable until Monday.

Sincerely,

Robert Dillon

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Richard A. Fineberg is an independent, Alaska-based analyst who has reported on economic and environmental issues associated with Alaska petroleum development for more than three decades. In addition to the numerous reports he has prepared for non-government organizations (available on-line at <http://www.finebergresearch.com>), he has served as a senior advisor to the governor of Alaska on oil and gas policy, and as an occasional consultant to various state and federal agencies, including the U.S. Internal Revenue Service, the Alaska Department of Revenue and the Regulatory Commission of Alaska.

Please address questions or comments on this report to:

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