



Devaris, Aimee &lt;adevaris@usgs.gov&gt;

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**Fwd: final North Slope assessment plan report**

13 messages

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Applegate, David <applegate@usgs.gov>  
To: Aimee Devaris <adevaris@usgs.gov>

Fri, Jun 23, 2017 at 12:02 PM

Aimee,

FYI and close hold. Combined plan for North Slope assessments that Murray worked on with BLM and BOEM. In case you didn't see through other channels...

Dave

----- Forwarded message -----

From: Hitzman, Murray &lt;mhitzman@usgs.gov&gt;

Date: Fri, Jun 23, 2017 at 9:36 AM

Subject: final North Slope assessment plan report


To: Richard Cardinale &lt;richard\_cardinale@ios.doi.gov&gt;, "Cameron, Scott" &lt;scott\_cameron@ios.doi.gov&gt;, Katharine MacGregor &lt;katharine\_macgregor@ios.doi.gov&gt;, William Werkheiser &lt;whwerkhe@usgs.gov&gt;, "Applegate, David" &lt;applegate@usgs.gov&gt;, Walter Guidroz &lt;wguidroz@usgs.gov&gt;, David Houseknecht &lt;dhouse@usgs.gov&gt;

this has now gone through USGS approval.

--

Murray W. Hitzman  
U. S. Geological Survey  
Associate Director - Energy and Minerals  
12201 Sunrise Valley Dr., MS 102  
Reston, VA. 20192  
703-648-4576

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Aimee Devaris <adevaris@usgs.gov>  
To: James Kendall <james.kendall@boem.gov>

Fri, Jun 23, 2017 at 5:00 PM

Jim,

Looks like they finally did pull together a more integrated plan with the BOEM input. Forwarding in case you haven't seen this.

Aimee

----- Forwarded message -----

From: Hitzman, Murray &lt;mhitzman@usgs.gov&gt;

Date: Fri, Jun 23, 2017 at 9:36 AM

Subject: final North Slope assessment plan report

To: Richard Cardinale &lt;richard\_cardinale@ios.doi.gov&gt;, "Cameron, Scott" &lt;scott\_cameron@ios.doi.gov&gt;, Katharine MacGregor &lt;katharine\_macgregor@ios.doi.gov&gt;, William Werkheiser &lt;whwerkhe@usgs.gov&gt;, "Applegate, David" &lt;applegate@usgs.gov&gt;, Walter Guidroz &lt;wguidroz@usgs.gov&gt;, David Houseknecht &lt;dhouse@usgs.gov&gt;

this has now gone through USGS approval.

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703-648-4576

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Aimee Devaris <adevaris@usgs.gov>  
To: "Applegate, David" <applegate@usgs.gov>

Fri, Jun 23, 2017 at 5:04 PM

Thanks, Dave. I'm really glad to see this coordinated version. I saw an earlier version with just the USGS input. The BOEM RD here was complaining that USGS wasn't working with them. I passed that feedback onto Murray. I think it was just a communication problem.

Aimee

Sent from my iPhone

[Quoted text hidden]

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Aimee Devaris <adevaris@usgs.gov>  
To: "Applegate, David" <applegate@usgs.gov>

Fri, Jun 23, 2017 at 5:06 PM

BTW -- the BLM Alaska office contacted me today about helping to make up the funding gap in FY17. I contacted Murray and Walter about that. Hope it works out. I know it's getting late in the FY to do much.

Have a good weekend.

Aimee

Sent from my iPhone

[Quoted text hidden]

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Kendall, James <james.kendall@boem.gov>  
To: Aimee Devaris <adevaris@usgs.gov>

Fri, Jun 23, 2017 at 5:09 PM



Thanks,

jjk

[Quoted text hidden]

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Dr. James (Jim) Kendall  
Regional Director  
Alaska OCS Region  
Bureau of Ocean Energy Management

3801 Centerpoint Drive, Suite 500  
Anchorage, AK 99503-5823  
Office: 907-334-5200  
Cell: 907-250-3852  
[james.kendall@boem.gov](mailto:james.kendall@boem.gov)



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Aimee Devaris <[adevaris@usgs.gov](mailto:adevaris@usgs.gov)>  
To: [bcribley@blm.gov](mailto:bcribley@blm.gov)

Fri, Jun 23, 2017 at 5:13 PM

Bud,

You probably have this, but forwarding just in case. Here's the coordinated version with BOEM and BLM input.

Aimee

----- Forwarded message -----

From: Hitzman, Murray <[mhitzman@usgs.gov](mailto:mhitzman@usgs.gov)>  
Date: Fri, Jun 23, 2017 at 9:36 AM  
Subject: final North Slope assessment plan report  
To: Richard Cardinale <[richard\\_cardinale@ios.doi.gov](mailto:richard_cardinale@ios.doi.gov)>, "Cameron, Scott" <[scott\\_cameron@ios.doi.gov](mailto:scott_cameron@ios.doi.gov)>, Katharine MacGregor <[katharine\\_macgregor@ios.doi.gov](mailto:katharine_macgregor@ios.doi.gov)>, William Werkheiser <[whwerkhe@usgs.gov](mailto:whwerkhe@usgs.gov)>, "Applegate, David" <[applegate@usgs.gov](mailto:applegate@usgs.gov)>, Walter Guidroz <[wguidroz@usgs.gov](mailto:wguidroz@usgs.gov)>, David Houseknecht <[dhouse@usgs.gov](mailto:dhouse@usgs.gov)>





this has now gone through USGS approval.

—

Murray W. Hitzman  
U. S. Geological Survey  
Associate Director - Energy and Minerals  
12201 Sunrise Valley Dr., MS 102  
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David Applegate <[applegate@usgs.gov](mailto:applegate@usgs.gov)>  
To: Aimee Devaris <[adevaris@usgs.gov](mailto:adevaris@usgs.gov)>

Fri, Jun 23, 2017 at 6:03 PM

Boy would that be helpful. We have good precedent with BLM and the mineral assessment, so they should know how to make it happen.

Thanks!

-----  
David Applegate, Ph.D.  
Acting Deputy Director  
U.S. Geological Survey  
12201 Sunrise Valley Drive MS 111, Reston VA 20192  
703 648 6600 voice, 703 648 7031 fax  
[applegate@usgs.gov](mailto:applegate@usgs.gov)

[Quoted text hidden]

Aimee Devaris <[adevaris@usgs.gov](mailto:adevaris@usgs.gov)>  
To: [stephen\\_wackowski@ios.doi.gov](mailto:stephen_wackowski@ios.doi.gov)

Sat, Jun 24, 2017 at 8:21 AM

Steve,

You probably have this, but forwarding just in case. Here's the coordinated version with BOEM and BLM input. I sent to Bud and Jim too. We are discussing how to fund the FY17 work in NPRA pending a final decision by DOI on the overall plan.

Aimee


----- Forwarded message -----  
From: Hitzman, Murray <[mhitzman@usgs.gov](mailto:mhitzman@usgs.gov)>  
Date: Fri, Jun 23, 2017 at 9:36 AM  
Subject: final North Slope assessment plan report  
To: Richard Cardinale <[richard\\_cardinale@ios.doi.gov](mailto:richard_cardinale@ios.doi.gov)>, "Cameron, Scott" <[scott\\_cameron@ios.doi.gov](mailto:scott_cameron@ios.doi.gov)>, Katharine MacGregor <[katharine\\_macgregor@ios.doi.gov](mailto:katharine_macgregor@ios.doi.gov)>, William Werkheiser <[whwerkhe@usgs.gov](mailto:whwerkhe@usgs.gov)>, "Applegate, David" <[applegate@usgs.gov](mailto:applegate@usgs.gov)>, Walter Guidroz <[wguidroz@usgs.gov](mailto:wguidroz@usgs.gov)>, David Houseknecht <[dhouse@usgs.gov](mailto:dhouse@usgs.gov)>


this has now gone through USGS approval.


—  
Murray W. Hitzman  
U. S. Geological Survey  
Associate Director - Energy and Minerals  
12201 Sunrise Valley Dr., MS 102  
Reston, VA. 20192  
703-648-4576

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James Kendall <james.kendall@boem.gov>  
To: Aimee Devaris <adevaris@usgs.gov>

Sat, Jun 24, 2017 at 6:19 PM

Thanks again,.....but, something you need to kick up the USGS chain. Richard Cardinale is the "Chief of Staff" for the ASLM. The Acting ASLM is "Kate MacGreger."

Jjk

Sent from my iPad  
[Quoted text hidden]

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<USGS-BLM-BOEM assessment plan 6-23.docx>

Aimee Devaris <adevaris@usgs.gov>  
To: James Kendall <james.kendall@boem.gov>

Sat, Jun 24, 2017 at 6:30 PM

Yes, Kate is in the "To" list also. Should have been first though (and with a better email cover). :)

Hope you are enjoying the sunshine!

Sent from my iPhone  
[Quoted text hidden]

James Kendall <james.kendall@boem.gov>  
To: Aimee Devaris <adevaris@usgs.gov>

Sat, Jun 24, 2017 at 6:39 PM

Yep, I passed along the document, but NOT your incoming email.....I was pinged to get "folks" onboard with the chain of command 😞

The fun never stops.....

Jjk

Sent from my iPad  
[Quoted text hidden]

Aimee Devaris <adevaris@usgs.gov>  
To: James Kendall <james.kendall@boem.gov>

Sat, Jun 24, 2017 at 7:16 PM

Wow. Ok thanks for letting me know.

Sent from my iPhone  
[Quoted text hidden]

James Kendall <james.kendall@boem.gov>  
To: Aimee Devaris <adevaris@usgs.gov>

Sat, Jun 24, 2017 at 7:21 PM

8/22/2017

DEPARTMENT OF THE INTERIOR Mail - Fwd: final North Slope assessment plan report

My pleasure!

We make a good Team!

Jjk

Sent from my iPad

[Quoted text hidden]

**DATE:** June 22, 2017

**TO:** Richard Cardinale, Acting Assistant Secretary for Land and Minerals Management  
Scott Cameron, Acting Assistant Secretary for Water and Science

**FROM:** William Werkheiser, Acting Director – U.S. Geological Survey (USGS)

**SUBJECT:** Joint Plan (USGS-BLM-BOEM) Response for Resource Assessment to Secretarial Order No. 3352

## **EXECUTIVE SUMMARY**

The purpose of this memo is to respond to Secretarial Order No. 3352, which aims to jump-start energy production on the North Slope of Alaska. Specifically, this memo discusses plans by which current resource assessments in the National Petroleum Reserve-Alaska (NPR-A) and the Section 1002 Area of the Arctic National Wildlife Refuge (ANWR) will be updated. This memo includes information from the U.S. Geological Survey (USGS), Bureau of Land Management (BLM), and Bureau of Ocean Energy Management (BOEM).

The proposed resource assessments will be conducted using established USGS protocol and as transparently as permitted by non-disclosure agreements related to proprietary data. This work will be coordinated with and will involve Alaska technical agencies including the Division of Geological and Geophysical Services, the Division of Oil and Gas, and the Alaska Oil and Gas Conservation Commission. The assessments include the following:

- **NPR-A:** A review of technical data has started, which includes 3-D seismic reflection data, exploration well data, and a large volume of ancillary data generated by ongoing USGS research and data submitted to BLM by industry. Estimated completion is the end of CY 2017; total costs are \$2.55 million.
- **ANWR Scenario 1 – Assumes that existing vintage 2-D seismic data are not reprocessed:** No updated assessment would be conducted because no new post-1998 data exist that compel a new assessment.
- **ANWR Scenario 2 – Assumes that 1984-1985 2-D seismic data will be reprocessed (not procured nor managed by USGS):** State-of-the-art industry reprocessing of this vintage data will be procured. Estimated completion is the end of CY 2018; total costs are \$4.85 million.
- **ANWR Scenario 3 – Assumes that a new 3-D seismic survey is undertaken (conducted and paid for by the private sector):** A new 3-D seismic grid will aid interpretation and mapping, which will lead to updated play (assessment unit) definition. Estimated completion is 4Q CY 2019; total costs are \$3.575 million. If the 3-D seismic survey is not completed during the winter of 2017-18, then completion will be delayed one year (to end CY 2020). In that case, the Central North Slope assessment will be advanced by one year.
- **Central North Slope:** Relies heavily on the public release of tax-incentive 3-D seismic data by the Alaska Department of Natural Resources. Estimated completion is the end of CY 2020; total costs are \$6.4 million.
- **West of NPR-A:** This area, both onshore and beneath Alaska state waters, contains only sparse and very old (1970s vintage) 2-D seismic data. Unless new seismic data become available, existing data will be reviewed and interpreted. Estimated completion is 4Q 2021; estimated costs are \$4.4 million.

## **BACKGROUND**

On May 31, 2017, the Department of the Interior (DOI) issued Secretarial Order No. 3352 that directs the Assistant Secretaries of Land and Minerals Management and Water and Science to submit a joint plan to the DOI Counselor for Energy Policy for updating assessments of the undiscovered, technically recoverable oil and natural gas resources of Alaska's North Slope, focusing on Federal lands including the NPR-A and the Section 1002 Area of ANWR:

**Sec. 4.b.** *A joint plan for updating current assessments of undiscovered, technically recoverable oil and natural gas resources of Alaska's North Slope, focusing on Federal lands including the NPR-A and the Section 1002 Area [of the Arctic National Wildlife Refuge]. The joint plan shall include consideration of new geological and geophysical data that has become available since the last assessments, as well as potential for reprocessing existing geological and geophysical data.*

The effort to update the current resource assessments in the NPR-A and the Section 1002 Area of ANWR is currently underway and led by the USGS in close coordination with the BLM and BOEM. The new resource assessments will replace the 2010 NPR-A and 1998 1002 Area USGS petroleum resource assessments. An estimate of more favorable hydrocarbon reserves could increase the level of interest for leasing in these areas.

The BLM will provide institutional knowledge and geologic data that will be useful to the USGS while comparing and evaluating existing information about NPR-A and the 1002 Area to produce a public report to estimate undiscovered, technically recoverable oil and gas resources. The BLM has the data from numerous geophysical surveys conducted throughout NPR-A, including from some high-potential areas that are currently unavailable for leasing. Geophysical data for the 1002 Area is more limited; the last geophysical survey was conducted in 1984-85. The BLM will be available to provide a technical review of the draft assessment report.

## **PROPOSED ASSESSMENTS**

Assessments directed by Secretarial Order 3352 (Section 4b) will be conducted using established USGS protocol. The work must be as transparent as permitted by non-disclosure agreements related to proprietary data. This work will be coordinated with Alaska technical agencies including DGGs, DOG, and the Alaska Oil and Gas Conservation Commission. The assessments would involve public review meetings in Anchorage, Houston and other locations as appropriate to build buy-in and support for assessment results from State agencies and the oil industry. The Assessment result will be incorporated into non-technical fact sheets summarizing results and technical reports summarizing the geological science that forms the foundation of the assessment. These documents would be submitted to USGS technical and editorial review as required by USGS Science Integrity Policy.

Proprietary industry geologic and geophysical data held by BOEM is unlicensed to the USGS. These data (subject to appropriate non-disclosure agreements) will be available for analysis and interpretation in Anchorage at the BLM Alaska State Office and the BOEM Alaska Regional Office. Any new geophysical and geological data acquired (seismic reflection, non-federal well data, etc.) not currently available (i.e., proprietary State of Alaska data) will be shared between

the three bureaus for the purpose of this analysis. BOEM is researching the availability and cost of the Smith Bay portion of the BLM 3D dataset pertinent to the assessment of the Caelus discovery. Lastly, BOEM, in conjunction with BLM, will pursue the acquisition of the Alaska state portion of the NPRA 3-D dataset collected in Smith Bay. This seismic data set is a critical piece of information for analyzing the possible geological impact on resources from the Caelus discovery. The cost to purchase the Smith 3D data is currently unknown.

As this work will be carried out jointly by USGS, BLM and BOEM, it is imperative that the DOI agencies conduct a consistent analysis between onshore and offshore resources, subject to rigorous statistical analysis and supportable probabilistic results.

Total cost for each assessment by Fiscal Year is included in Table 1 below. Detailed plans and timelines for conducting various North Slope assessments are covered on subsequent pages.

**Table 1: Cost information, Alaska North Slope Assessment Options (numbers in millions of dollars)**

<b>Assessment</b>	<b>FY17</b>	<b>FY18</b>	<b>FY19</b>	<b>FY20</b>	<b>FY21</b>	<b>FY22</b>	<b>Total</b>
National Petroleum Reserve – Alaska	1.600	0.950	0.000	0.000	0.000	0.000	<b>2.550</b>
Alaska National Wildlife Refuge							
ANWR – Option 1	0.000	0.000	0.000	0.000	0.000	0.000	<b>0.000</b>
ANWR – Option 2	1.350	2.550	0.950	0.000	0.000	0.000	<b>4.850</b>
ANWR – Option 3	0.000	0.375	2.250	0.950	0.000	0.000	<b>3.575</b>
Central North Slope	0.000	0.000	3.250	2.200	0.950	0.000	<b>6.400</b>
West of NPRA	0.000	0.000	0.000	1.250	2.400	0.750	<b>4.400</b>

Note: Totals not provided due to range of assessment scenarios provided

### **National Petroleum Reserve – Alaska**

Review of technical data has started and involves personnel from USGS, BOEM and BLM. Data sets being reviewed include 3-D seismic reflection data, exploration well data, and a large volume of ancillary data generated by ongoing USGS research and data submitted to the BLM by industry. BOEM staff and resources will be available for assessing the oil and gas potential of NPR-A and the 1002 area of ANWR.

BOEM geologists and geophysicists have analyzed the geologic and geophysical data for all sales in the NPRA starting with the 1999 sale through the most recent sale in 2016, and USGS has conducted research on all rock units to be evaluated. In addition, BOEM has access to all BLM seismic and well information as it becomes available. BOEM has also assessed the resource potential of adjacent Outer Continental Shelf (OCS) offshore of NPRA and ANWR. Re-examining the geologic settings of both the onshore and offshore areas will enhance our understanding of the oil and gas potential of the Alaska North Slope.

The first three tasks of the workflow, therefore, will comprise review of all data and analyses by an integrated team of USGS, BLM and BOEM personnel and building of consensus on plays to be assessed and risk structure to be imposed on the assessment. This team will determine the geologic risk of plays and assessment units to ensure resources are consistently evaluated, especially where geologic plays

extend from onshore to offshore. USGS, BOEM, BLM and other government experts will review geologic play risks for consistency. It is anticipated that this step can be completed late in the third quarter (3Q) of calendar year (CY) 2017.

BOEM scientists will also assess the Beaufort OCS potential as might be influenced by new discoveries onshore. BOEM will also revise the resource assessment of two existing plays equivalent to the Torok and Nanushuk Formations in the Beaufort Sea. BOEM anticipates completing the Beaufort Sea nearshore assessment by the end of September 2017 and in sufficient time to be incorporated into the updated NPRA assessment due at the end of CY 2017.

Public review meetings and the USGS assessment can be held in 4Q CY2017, and results can be released late in 4Q CY2017. Total USGS costs are estimated at \$2.55 million, and a timeline of assessment tasks is included in Figure 2. Included in these costs is \$0.50 million dedicated to the Alaska Department of Natural Resources to conduct analytical services in support of the NPRA resource assessment.

**Figure 2: Estimated completion timeline for NPRA Resource Assessment**

Task	CY 2017				CY 2018				CY 2019			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Review technical data and interpret seismic data	■	■										
Refine interpretations of seismic and well data		■	■									
Define AUs, prepare for public review & assessment			■									
Conduct public review meetings				■								
Conduct assessment				■								
Prepare release document (fact sheet)				■								
Conduct technical and editorial review				■								
Release assessment				■								
Hold briefings for Admin., Congress, State et al.				■								

### Arctic National Wildlife Refuge 1002 Area

Three ANWR 1002 Area assessment scenarios are considered, which are detailed below:

- **Scenario 1: Assumes that existing vintage 2-D seismic data are not reprocessed**

No updated assessment would be conducted because no new post-1998 data exist that would compel the USGS to consider conducting a new assessment.

- **Scenario 2: Assumes that the 1984-1985 2-D seismic data will be reprocessed (not procured or managed by USGS)**

The timeline for this scenario includes procurement of state-of-the-art industry reprocessing of the vintage data during 4Q CY2017, and reprocessing of the vintage data during late 4Q CY2017 through early 2Q CY2018 (the seismic company that collected original data estimates six months for reprocessing). The BLM will work with the USGS regarding the reprocessing of existing geological and geophysical data of the 1002 Area and will assist as required in the collection of any additional seismic data collected on onshore Federal mineral estate. USGS and BOEM scientists would make multiple visits to the company conducting the reprocessing to provide interactive geological constraints to assure optimal results.

During the reprocessing, new data will be collected from well samples adjacent to the 1002 Area and from outcrop samples collected during a short field season in 2017. These data will include constraints on oil source-rock quality, uplift and exhumation history, and reservoir-rock quality. USGS recommends collection of an airborne gravity gradiometry survey across the 1002 Area pending sufficient funds, but neither procurement nor interpretation of such a survey are included in the USGS budget.

After reprocessed seismic data are delivered, a team of USGS and BOEM scientists will interpret the data, produce maps, and define plays (assessment units) to be evaluated. It is estimated that these tasks can be completed during 1Q-3Q CY2018. This schedule should allow public review meetings to be held during 3Q-4Q CY2018, and the assessment and technical review of release materials during 4Q CY2018. Public release of results is planned for late 4Q CY2018.

Total USGS costs are estimated at \$4.85 million over three fiscal years, and a timeline of assessment tasks is included in Figure 3 below. Included in these costs are \$0.75 million dedicated to the Alaska Department of Natural Resources to conduct tasks associated with analytical services in support of the ANWR 1002 Area assessment.

**Figure 3: Estimated completion timeline for ANWR Resource Assessment (Scenario 2)**

Task	CY 2017				CY 2018				CY 2019			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Seismic data reprocessing (existing 2-D data) *				■	■	■						
Review technical data and interpret seismic data					■	■						
Refine interpretations of seismic and well data						■	■					
Define AUs; prepare for public review & assessment							■	■				
Conduct public review meetings								■				
Conduct assessment									■			
Prepare release document (fact sheet)										■		
Conduct technical and editorial review											■	
Release assessment												■
Hold briefings for Admin., Congress, State, et al.												■

\* USGS does not procure reprocessed vintage 2-D seismic data, but provides geological and geophysical advice to seismic vendor

● **ANWR Scenario 3: Assumes that a 3-D seismic survey is conducted during 4Q CY2017 and 1Q CY2018 (conducted and paid for by the private sector)**

This task will be difficult, but not impossible, to achieve in the timeline shown, including initial processing of the new 3-D data. Interpretation and mapping of the 3-D and ancillary data by USGS and BOEM scientists will occur during 3Q and 4Q of CY 2018 and 1Q of CY2019. Definition of plays (assessment units) through public review of the assessment work products will be completed by late 3Q of 2019, and the assessment, report preparation, technical review, and release of the assessment results will occur during 4Q of 2019.

If the 3-D seismic survey is not completed during the winter of 2017-18, then completion will be delayed one year (to end CY 2020). In that case, the workflow for assessment of the Central North Slope will be advanced by one year and will commence during 3Q or 4Q of CY 2018.

A request should be made to the owners of the KIC well (API #025-20001-00) to release the well data for purposes of this assessment. The KIC well was drilled by a consortium of oil companies led by Chevron on Kaktovik Inupiat Corporation lands in ANWR in 1986. As it is the only well drilled within the confines of ANWR, data from this well would significantly influence our understanding of the geology and resource potential of the 1002 area.

Total USGS costs are estimated at \$3.575 million, and a timeline of assessment tasks is included in Figure 4 below. Included in these costs are \$0.5 million dedicated to the Alaska Department of Natural Resources to collaborate in field work and ancillary analytical tasks.

**Figure 4: Estimated completion timeline for ANWR Resource Assessment (Scenario 3)**

Task	CY 2017				CY 2018				CY 2019			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
3-D seismic survey and processing of data *				■	■	■	■	■				
Review technical data and interpret seismic data							■	■	■			
Refine interpretations of seismic and well data									■	■		
Define AUs; prepare for public review & assessment										■	■	
Conduct public review meetings											■	
Conduct assessment												■
Prepare release document (fact sheet)												■
Conduct technical and editorial review												■
Release assessment												■
Hold briefings for Admin., Congress, State, et al.												■

\* USGS plays no role in designing or acquiring a 3-D seismic survey

### Central North Slope

Assessment of the Central North Slope will rely heavily on the public release of tax-incentive 3-D seismic reflection data by the Alaska Department of Natural Resources. Assuming that several of these data sets are released before or during 2Q CY2018 and that funding is available for the USGS to license other 3-D and 2-D seismic data, an assessment likely can be completed by the end of CY2020. As no Federal lands are involved in this assessment, much or all of the technical analyses will be completed by USGS scientists, with the expectation that BOEM and BLM scientists will provide technical review of the interpretations. Alaska state agencies will be invited to collaborate on data interpretation and play (assessment unit) definition.

If the ANWR 1002 Area 3-D seismic survey is not completed during the winter of 2017-2018, the timeline in Figure 5 will be advanced by one year. In that case, the workflow for assessment of the Central North Slope will commence during 3Q or 4Q of 2018.

Total USGS costs are estimated at \$6.4 million. Included in these costs are \$0.4 million dedicated to the Alaska Department of Natural Resources to collaborate in field work and ancillary analytical tasks.

### **West of NPRA**

The area west of NPRA, both onshore and beneath Alaska state waters, contains only sparse and very old (1970s vintage) 2-D seismic data. Workflow for this assessment will include review with BOEM of seismic data in the Chukchi Sea to evaluate the extent to which those data may inform the geology of the onshore and state waters. Unless new seismic data become available, it is anticipated that existing data can be reviewed and interpreted, and that an assessment can be conducted between 3Q CY2020 and 4Q CY2021. It is anticipated that much or all of the technical analyses will be completed by USGS scientists with the expectation that BOEM and BLM scientists will provide technical review of the interpretations. Because much of the onshore area consists of Native lands, USGS will invite the Arctic Slope Regional Corporation to also provide a technical review of USGS work.

Total costs are estimated at \$4.4 million. Included in these costs are \$0.2 million dedicated to the Alaska Department of Natural Resources to collaborate in field work and ancillary analytical tasks.