

## National Assessment of Oil and Gas Fact Sheet

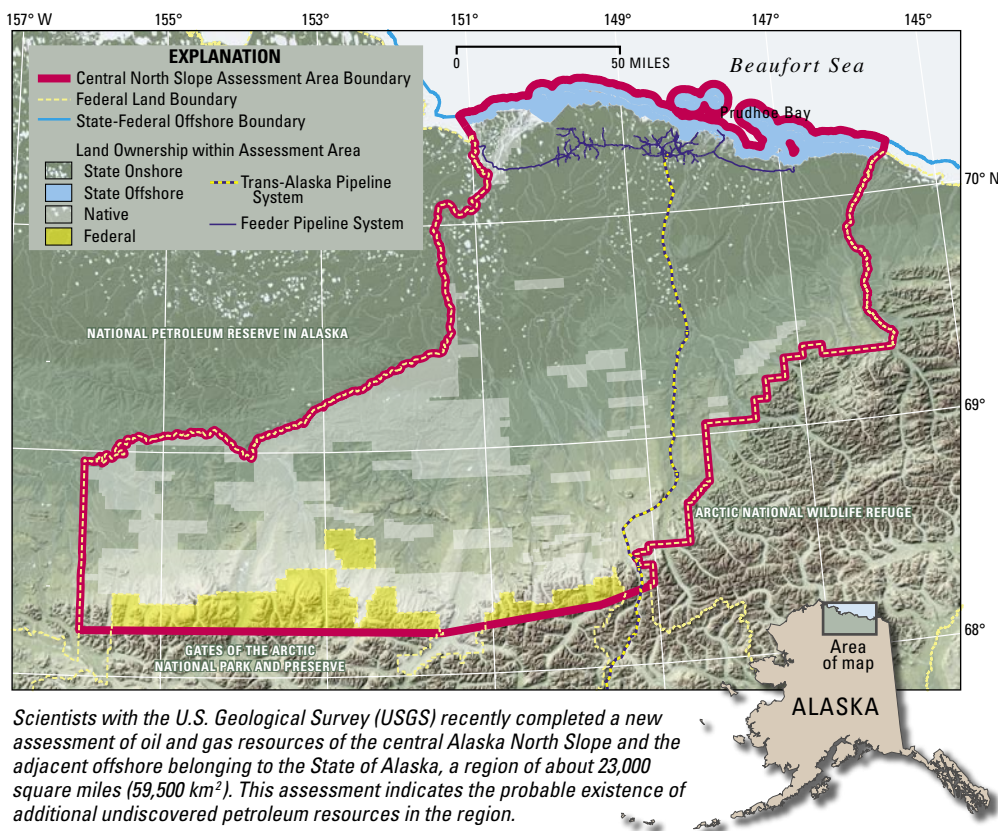
# Oil and Gas Assessment of Central North Slope, Alaska, 2005

**T**he U.S. Geological Survey (USGS) recently completed a new assessment of undiscovered oil and gas resources of the central part of the Alaska North Slope and the adjacent offshore area. Using a geology-based assessment methodology, the USGS estimates that there are undiscovered, technically recoverable mean resources of 4.0 billion barrels of oil, 37.5 trillion cubic feet of natural gas, and 478 million barrels of natural gas liquids.

### Introduction

The U.S. Geological Survey (USGS) recently completed an assessment of undiscovered oil and gas resources of the central Alaska North Slope and the adjacent offshore belonging to the State of Alaska. This area lies between the National Petroleum Reserve in Alaska (NPR) and the Arctic National Wildlife Refuge (ANWR) and extends from the Brooks Range northward to the State-Federal offshore boundary. Most commercial oil fields and virtually all petroleum-producing infrastructure in northern Alaska are located within the assessment area. This area, which consists mostly of State and Native lands covering about 23,000 square miles (59,500 km<sup>2</sup>), is maturely explored in the north but only lightly explored in the south. Approximately 15 billion barrels of oil (including natural-gas liquids) have been produced from the assessment area (most from the giant Prudhoe Bay field), and remaining (discovered) reserves include about 7 billion barrels of oil and about 35 trillion cubic feet of natural gas.

This assessment used the same geology-based methodology used in recent USGS assessments of NPR and the ANWR 1002 area. The assessment is based on geologic elements, including hydrocarbon source



Scientists with the U.S. Geological Survey (USGS) recently completed a new assessment of oil and gas resources of the central Alaska North Slope and the adjacent offshore belonging to the State of Alaska, a region of about 23,000 square miles (59,500 km<sup>2</sup>). This assessment indicates the probable existence of additional undiscovered petroleum resources in the region.

rocks, reservoir rocks, and traps. The minimum accumulation sizes considered in this assessment are 5 million barrels of technically recoverable oil and 100 billion cubic feet of technically recoverable gas. These minimum accumulation sizes are smaller than those used in USGS assessments of NPR and the ANWR 1002 area in recognition of the extensive infrastructure and recent development of relatively small oil accumulations in the assessment area. Resources assessed include technically recoverable conventional oil, natural gas, and natural-gas liquids.

Although six total petroleum systems were defined, geologic evidence suggests significant mixing of hydrocarbons among those systems. Therefore, the assessment was conducted under the assumption of a single, composite total petroleum system.

Twenty-four plays (assessment units) were defined and assessed.

### Resource Summary

The USGS estimated technically recoverable, undiscovered resources of oil, natural gas (nonassociated and associated), and natural-gas liquids (from nonassociated and associated gas) in the central North Slope assessment area. Oil resources range between 2.6 and 5.9 billion barrels of oil (BBO) (95% and 5% probabilities), with a mean of 4.0 BBO. Nonassociated gas resources range between 23.9 and 44.9 trillion cubic feet (TCF) (95% and 5% probabilities), with a mean of 33.3 TCF. In addition, means of 4.2 TCF of associated gas, 387 million barrels of natural-gas liquids (MMBNGL) from nonassociated gas, and 91 MMBNGL from associated gas are

estimated to occur (see table for estimates over a range of probability). Nearly two-thirds of the mean undiscovered oil is estimated to occur in three plays in the northern part of the area—Brookian Cliniform, Brookian Topset, and Triassic Barrow Arch. About half of the mean undiscovered nonassociated natural gas is estimated to occur in four plays in the southern part of the area—Brookian Cliniform, Thrust Belt Triangle Zone, Thrust Belt Lisburne, and Basement Involved Structural.

It is estimated that 91% of undiscovered oil resources occurs in accumulations of less than 250 million barrels of

oil (MMBO) recoverable and that 96% of undiscovered nonassociated gas resources occurs in accumulations smaller than 3.0 TCF recoverable. The occurrence of larger oil and gas accumulations is unlikely.

*Kenneth J. Bird, David W. Houseknecht, Emil D. Attanasi, Thomas E. Moore, Phillip H. Nelson, Christopher J. Potter, Christopher J. Schenk, John H. Schuenemeyer, Mahendra K. Verma, Richard W. Saltus, Jeffery D. Phillips, Ronald R. Charpentier, Troy A. Cook, Timothy R. Klett, and Richard M. Pollastro*

*Edited by Peter H. Stauffer and James W. Hendley II  
Graphic design by Susan Mayfield and Sara Boore*

**For Further Information**

Supporting geologic studies of total petroleum systems, assessment units, economic analysis, and the methodology used in the Central North Slope assessment are in progress. Assessment results are available at the USGS Energy Resources Program Web site, <http://energy.usgs.gov/>.

or contact

Kenneth J. Bird or David W. Houseknecht  
(kbird@usgs.gov; dhouse@usgs.gov)

This Fact Sheet and any updates to it are available online at <http://pubs.usgs.gov/fs/2005/3043/>

**Central North Slope assessment results, showing technically recoverable, conventional, undiscovered oil and gas.**

[MMBO, million barrels of oil; BCFG, billion cubic feet of gas; MMBNGL, million barrels of natural-gas liquids. Results shown are fully risked estimates. Gas volumes associated with oil fields are shown on the "Oil" row and nonassociated gas volumes on the "Gas" row. For gas fields, all liquids are included under NGL (natural-gas liquids) category. F95 denotes a 95% chance of at least the amount tabulated. Other fractiles are defined similarly. Fractiles are not additive. Gray shading indicates not applicable]

Assessment Unit	Accumulation type	Oil (MMBO)				Gas (BCFG)				NGL (MMBNGL)			
		F95	F50	F05	Mean	F95	F50	F05	Mean	F95	F50	F05	Mean
<b>BROOKIAN STRATIGRAPHIC UNITS</b>													
Brookian Topset	Oil	190	417	772	441	144	316	588	335	2	4	7	4
	Gas					0	525	1306	584	0	6	16	7
Brookian Cliniform	Oil	810	1561	2668	1626	904	1748	2993	1824	17	33	58	35
	Gas					2913	6133	10967	6436	36	75	134	79
<b>BEAUFORTIAN STRATIGRAPHIC UNITS</b>													
Kemik-Thomson	Oil	46	222	556	252	83	400	1002	454	4	18	46	21
	Gas					466	2075	4931	2308	6	27	64	30
Beaufortian Kuparuk Topset	Oil	78	166	305	175	60	477	238	136	1	2	4	2
	Gas					0	477	1253	536	0	6	16	7
Beaufortian Cretaceous Shelf Margin	Oil	0	0	0	0	0	0	0	0	0	0	0	0
	Gas					0	522	1415	598	0	7	18	8
Beaufortian Upper Jurassic Topset East	Oil	0	0	32	5	0	0	32	5	0	0	0	0
	Gas					0	0	605	141	0	0	8	2
Beaufortian Upper Jurassic Topset West	Oil	40	136	284	145	40	135	280	144	1	2	4	2
	Gas					0	246	771	288	0	3	10	4
Beaufortian Cliniform	Oil	0	94	340	114	0	138	503	168	0	3	12	4
	Gas					0	904	2669	956	0	12	35	12
<b>STRUCTURAL UNITS</b>													
Brookian Topset Structural North	Oil	0	156	882	263	0	62	372	107	0	0	3	1
	Gas					0	0	1338	288	0	0	7	1
Brookian Topset Structural South	Oil	0	0	119	21	0	0	50	9	0	0	0	0
	Gas					220	1972	6009	2383	1	14	46	17
Brookian Cliniform Structural North	Oil	16	113	371	143	17	118	385	149	0	2	8	3
	Gas					0	145	910	248	0	1	10	3
Brookian Cliniform Structural South	Oil	0	0	91	17	0	0	43	8	0	0	1	0
	Gas					946	2418	4662	2550	9	24	49	26
Beaufortian Structural	Oil	0	0	75	14	0	0	70	13	0	0	1	0
	Gas					0	1803	5321	2124	0	19	57	22
Ellesmerian Structural	Oil	0	0	0	0	0	0	0	0	0	0	0	0
	Gas					0	1370	3456	1502	0	18	45	20
Basement Involved Structural	Oil	0	0	115	24	0	0	71	14	0	0	2	0
	Gas					672	2612	6622	3016	9	33	84	38
Thrust Belt Triangle Zone	Oil	0	15	217	50	0	9	134	31	0	0	2	0
	Gas					750	3264	8841	3843	7	34	99	41
Thrust Belt Lisburne	Oil	0	47	250	75	0	46	249	74	0	1	5	1
	Gas					964	3250	7355	3589	12	40	92	45
<b>ELLESMERIAN AND FRANKLINIAN STRATIGRAPHIC UNITS</b>													
Triassic Barrow Arch	Oil	91	337	924	400	112	418	1147	496	2	9	25	11
	Gas					0	0	0	0	0	0	0	0
Ivishak Barrow Flank	Oil	0	0	0	0	0	0	0	0	0	0	0	0
	Gas					0	294	1183	387	0	4	15	5
Lisburne Barrow Arch	Oil	16	109	324	131	15	106	315	129	0	3	8	3
	Gas					0	0	0	0	0	0	0	0
Lisburne Barrow Flank	Oil	0	0	0	0	0	0	0	0	0	0	0	0
	Gas					0	796	2929	1035	0	10	38	13
Endicott Truncation	Oil	0	63	201	77	0	69	223	85	0	2	8	3
	Gas					0	0	0	0	0	0	0	0
Endicott	Oil	0	0	0	0	0	0	0	0	0	0	0	0
	Gas					0	425	1310	500	0	6	17	6
Franklinian	Oil	0	6	48	12	0	8	66	17	0	0	2	1
	Gas					0	0	0	0	0	0	0	0
<b>Total Conventional Resources</b>	Oil	<b>2565</b>	<b>3851</b>	<b>5854</b>	<b>3984</b>	<b>2681</b>	<b>4080</b>	<b>6092</b>	<b>4198</b>	<b>55</b>	<b>88</b>	<b>138</b>	<b>91</b>
	Gas					<b>23939</b>	<b>32678</b>	<b>44873</b>	<b>33318</b>	<b>278</b>	<b>380</b>	<b>521</b>	<b>387</b>