Norton Basin Planning Area (Alaska) – Province Summary

2006 Oil and Gas Assessment

Location

The Norton Basin OCS Planning Area is located off the coast of west-central Alaska (fig. 1) and approximately coincides with the Norton Sound area in the northern Bering Sea. It is bounded by the Seward Peninsula on the north and the Yukon Delta and St. Lawrence Island on the south and southwest (fig. 2). The western boundary is defined by the United States – Russia Convention Line of 1867. The geologically prospective portion of the planning area, Norton Basin, is located in the central portion of the planning area (fig. 2). It is approximately 200 miles long, and ranges from about 20 to about 75 miles in width.

Leasing and Exploration

Two stratigraphic test wells or "COST" (Continental Offshore Stratigraphic Test) wells were drilled in the basin prior to leasing: COST #1 well in 1980 and COST #2 well in 1982 (fig. 2). Twenty-one oil companies participated in financing the drilling and in receiving data from these 2 wells. Over an interval of ten years seismic companies collected almost 50,000 line miles of CDP seismic data in the overall Norton Basin OCS area as well. Varying amounts of high-resolution seismic data and gravity/magnetic data were also collected.

In March of 1983, OCS Sale 57 was held in Norton Basin, offering lease tracts located mostly east of 166°W longitude (~16 mi west of Nome in fig. 1; also see Turner et al., 1986, fig. 1, p. 2). Fifty-nine leases comprising almost 336,000 acres were awarded for total high bids of $325 million. In the summers of 1984 and 1985, six exploration wells were drilled - one by ARCO and five by Exxon (fig. 2). No discoveries were announced, and these wells were subsequently plugged and abandoned. A second sale, Sale 100, was planned and would have offered most of the western portion of the basin for lease. This sale was never held and, as a result, a large part of the basin, including most of the western "St. Lawrence" subbasin, has never been available for testing.

Geological Setting of Norton Basin

Norton Basin is an extensional basin associated with right-lateral strike-slip movement along the Kaltag Fault (fig. 2). The formation of Norton Basin probably began during Late Cretaceous time when movement along the Kaltag Fault was initiated. In latest Cretaceous and early Paleogene time, this strike-slip faulting and regional extension produced major subsidence by block faulting in the Norton Basin area. Two subbasins formed during this period of fault-controlled subsidence: the St. Lawrence (or western) Subbasin and the Stuart (or eastern) Subbasin (fig. 3). These subbasins are separated by a linear positive feature called the Yukon Horst (figs. 3 and 4). The entire Norton Basin area is underlain by an assortment of probable Precambrian and Paleozoic to Early Mesozoic-age metamorphosed clastics and carbonates and scattered igneous intrusives similar to rocks observed on the Seward

Peninsula.

The St. Lawrence Subbasin is filled with up to 16,000 feet of Tertiary-age sediments, while in the Stuart Subbasin total sediment thickness ranges up to 24,000 feet of Tertiary deposits. The earliest Tertiary (Eocene and probable Paleocene) sediments initially deposited in both subbasins and along the Norton Basin edges consist mainly of non-marine clastics – principally alluvial fan and delta plain deposits (fig. 5). The Yukon Horst blocked marine invasion into the eastern subbasin from the Paleocene to the mid-Oligocene, causing the subbasins to exist as discrete depocenters during this time. As a result, Early Tertiary sediments found above basement in the COST # 1 well in the central St. Lawrence Subbasin consist of a thin initial interval of continental deposits followed by sediments deposited in environments predominantly ranging from probable marine to outer neritic /upper bathyal. Contemporary Early Tertiary sediments encountered above basement in the COST # 2 well in the central Stuart Subbasin also initially indicate deposition under continental conditions, but are followed by mostly transitional marine conditions with one short interval of probable inner to middle neritic depositional environments (fig. 5).

Fault-controlled subsidence in the Norton Basin ceased by mid-Oligocene time, and thereafter subsidence was regional. From the late Oligocene to the present, a shelf environment much like that of the present-day Norton Sound area characterized deposition across the entire Norton Basin. During this time, paleoenvironments in the overall Norton Basin ranged upwards in the section from outer neritic/upper bathyal to predominantly inner to middle neritic (fig. 5).

Potential Traps

Norton Basin contains a variety of structural traps, such as faulted anticlines, simple drape anticlines, and fault blocks. Seismic mapping in Norton Basin identified almost two hundred structural prospects, the largest being about 186,000 acres in size. Stratigraphic traps occur along the basin margins and the flanks of the Yukon Horst. Mean values of prospect closure-area distributions for the various plays range from 5,660 to 10,100 acres.

Reservoir Formations

Sandstones in the Norton Basin are composed of metamorphic detritus eroded from uplifted horsts in and around the basin, as well as volcaniclastics eroded from the volcanic belt to the south and east of the basin. These sediments contain significant fractions of chemically and mechanically unstable grains, probably resulting in low effective porosity and permeability of accumulated sandstone deposits where burial depth is greatest in the central parts of the subbasins (Turner et al., 1986).

Sandstones are common within the Paleocene and Eocene rocks overlying basement, and have conventional core porosities ranging up to 12.8 percent (Norton Basin COST No. 2 well; Turner et al., 1983). The depositional environments for these older sandstones are primarily alluvial fan to delta plain. Porosity for these sandstones is generally less than 10 percent at burial depths exceeding 10,000 ft (Zerwick, 1998), which probably represents a reservoir quality floor.

The Oligocene section contains most of the reservoir quality sandstone encountered in the eight wells drilled. Depositional environments for these sandstones range from fluvial to neritic. Porosities range from 10 to 30 percent with permeabilities running

as high as one darcy or better. A significant aggregate thickness (>1,000 ft; Turner et al., 1986, p. 56 and fig. 19, p. 63) of probable turbiditic sandstones was encountered in the COST No. 1 well, but porosities were marginal and permeabilities generally poor in this sediment type.

Miocene sandstones in the basin were deposited in a shallow marine environment. Individual sand units are thinner than in the older deposits but porosity and permeability remain potentially good due to shallower burial depths and less compaction.

Petroleum Source Rock Potential

Organic geochemistry suggests that source quality is a major element of risk to Norton Basin's potential as a hydrocarbon province. The COST wells provide the best source of geochemical data in the basin due to the fact that they were the only wells drilled in the basin to penetrate deeply enough to encounter thermally mature potential source sediments (generally below about 10,000 ft).

In the St. Lawrence (western) subbasin (figs. 3 and 4), the COST #1 well encountered possible source rocks dominated by humic, type III gas-prone kerogen, composed mostly of woody, coaly, and herbaceous materials, from 9,000 to 12,600 feet. The oil window (0.6-1.35% vitrinite reflectance) occurs between 9,700 and 12,300 feet in this well (Turner et al., 1986, fig. 30). This potential source rock is deemed to have low potential for oil and gas generation (Turner et al., 1986)

In the Stuart (eastern) subbasin (figs. 3 and 4), the COST #2 well also encountered type III, humic, gas-prone kerogen and abundant amounts of coal. The best source rock indications in this well occur from about 9,500 to 12,000 feet. The inferred current oil generation window extends from 10,000 to 13,500 feet. Significant amounts of organic material are present, but are generally associated with coal-bearing samples. Minor amounts of gaseous and liquid hydrocarbons plus bituminous material are present.

Both COST wells encountered significant thicknesses of thermally mature sediments that contain gas-prone organic material. However, wells drilled into structures in the Stuart Subbasin found only minor indications of migrated hydrocarbons. DesAutels (1988) speculated that the problem could be limited migration to the structures, low degree of bitumen-to-hydrocarbon conversion and/or lateral variation of the source rocks from the data point. The St. Lawrence basin hydrocarbon potential is largely untested.

The Norton Basin areas interpreted to include thermally mature potential source sediments are shown in figure 6. The volume of sediment in the source area is greater in the western subbasin, but is not as deep as in the eastern subbasin. A CO_2 gas seep occurs on the northeastern edge of the western subbasin, possibly produced by the thermal decarbonation of carbonate units in the basement rocks.

Petroleum Migration Patterns

Shale formations sufficiently thick and laterally continuous to form regional seals occur throughout Norton Basin as indicated in the COST and exploration wells. Reservoir quality rock was encountered in the six Norton Basin exploration wells and appears to be adequately sealed by interspersed shale intervals. Horst and graben block faults provide vertical avenues for potential migration of hydrocarbons from the thermally mature rocks in the subbasin depocenters to potential reservoir/trap areas but could have also

carried migrating gas to surface seeps where faults approach the seafloor.

Play Descriptions

The Norton Basin contains five frontier plays: (1) the Upper Tertiary Basin Fill play; (2) the Mid-Tertiary East Subbasin Fill play; (3) the Mid-Tertiary West Subbasin Fill play; (4) the Lower Tertiary Subbasin Fill play; and (5) the Basement play.

Play 1, the Upper Tertiary Basin Fill play, includes all of the late Oligocene and younger age clastic sediments deposited across Norton Basin (figs. 2, 4, and 5). During this time transitional to outer neritic environments prevailed, with the deeper water environments occurring to the west over the old St. Lawrence Subbasin. Reservoir sands occur predominantly in the upper Oligocene section, with thinner reservoir sand units occurring in the early Miocene section.

Play 2, the Mid-Tertiary East Subbasin Fill play (figs. 3, 4, and 5), includes Eocene through early Oligocene clastic sediments deposited in the Stuart Subbasin. Delta plain to marginal marine Oligocene sands are the most likely reservoir rocks.

Play 3, the Mid-Tertiary West Subbasin Fill play (fig. 3, 4, and 5), encompasses the Eocene to early Oligocene clastic sediments deposited in the St. Lawrence Subbasin. The most likely reservoir rocks are shelf sands and turbidites, except along the Yukon Horst and the basin margin where alluvial fan and deltaic deposits may occur.

Play 4, the Lower Tertiary Subbasin Fill play (fig. 7), includes all the deep clastic sediments in both subbasins ranging in age from possible latest Cretaceous(?) and Paleocene to early Eocene (figs. 4 and 5). These deep rocks, which range in depth from approximately 12,000 to 24,000 feet, are predominately alluvial fan and delta plain deposits.

Play 5, the Basement play (figs. 4 and 5) encompasses all of the Paleozoic to Mesozoic age metamorphic, low-grade-metasedimentary, and igneous rocks that underlie the Norton Basin Tertiary fill. The potential for reservoir capacity is dependent upon fracture porosity, permeability developing along faults or folds in the basement, and/or the presence of secondary porosity. Postulated source rocks are Mesozoic carbonates and shale, and thermally mature Eocene sediments. The two COST wells in the deeper basin depocenters penetrated basement and two exploration wells (Y-0414 and Y-0430) penetrated basement along the uplifted Yukon horst (figs. 3, 6, and 7). No producible hydrocarbons were encountered. Because of its highly speculative nature, no resource numbers were calculated for the Basement play.

Oil and Gas Resources of Norton Basin

The 2006 oil and gas assessment of Norton Basin assessed resources for four plays. These plays, Plays 1-4 (figs. 2, 3, 4, 5, and 7) were quantitatively assessed using the *GRASP* computer model. A fifth potential play in the metamorphosed rocks of acoustic basement (figs. 4 and 5) was identified but not assessed because of the low probability for the occurrence of pooled, conventionally recoverable hydrocarbons.

Table 1 summarizes the 2006 assessment results by commodity for the Norton Basin and forecasts resources of 56 Mmb of condensate and 3.058 Tcf of gas (mean risked technically recoverable resources). Condensate resources for Norton Basin range up to 244 Mmb and gas resources range up to 13.273 Tcf at the F05 fractile (5% chance). No oil (free oil) endowment is calculated for Norton Basin. Gas and

condensate liquids dissolved in gas comprise 100 percent of the mean risked undiscovered technically recoverable resource endowment.

Norton Basin OCS Planning Area, 2006 Assessment, Undiscovered Technically-Recoverable Oil & Gas			
Assessment Results as of November 2005			
Resource Commodity (Units)	Resources *		
	F95	Mean	F05
BOE (Mmboe)	0	601	2,606
Total Gas (Tcfg)	0.000	3.058	13.273
Total Liquids (Mmbo)	0	56	244
Free Gas** (Tcfg)	0.000	3.058	13.273
Solution Gas (Tcfg)	0.000	0.000	0.000
Oil (Mmbo)	0	0	0
Condensate (Mmbc)	0	56	244

** Risked, Technically-Recoverable*

*** Free Gas Includes Gas Cap and Non-Associated Gas*

F95 = 95% chance that resources will equal or exceed the given quantity

F05 = 5% chance that resources will equal or exceed the given quantity

BOE = total hydrocarbon energy, expressed in barrels-of-oil-equivalent, where 1 barrel of oil = 5,620 cubic feet of natural gas

Mmb = millions of barrels

Tcf = trillions of cubic feet

Table 1

Table 2 lists the conditional sizes of the 10 largest pools in the Norton Basin Federal offshore assessment province. The four quantified plays in Norton Basin are estimated to contain a maximum of 90 pools, all of which are gas pools with a minority fraction of associated dissolved condensate. The largest hypothetical undiscovered pool in Norton Basin contains a mean conditional resource of 421 Mmboe, with a maximum (F05) conditional resource of 1,513 Mmboe. Converting the BOE resource volumes to all-gas cases, the largest pool in Norton Basin contains a mean conditional resource of 2.366 Tcfge, with a maximum (F05) conditional resource of 8.503 Tcfge. Only four pools have mean conditional resources exceeding 100 Mmboe (or 0.562 Tcfge).

Norton Basin OCS Planning Area, Alaska, 2006 Assessment, Conditional BOE Sizes of Ten Largest Pools				
Assessment Results as of November 2005				
Pool Rank	Play Number	BOE Resources * (Mmboe)		
		F95	Mean	F05
1	3	71	421	1513
2	1	26	206	782
3	3	42	163	387
4	2	14	146	457
5	3	28	97	213
6	1	12	70	178
7	3	20	67	153
8	3	15	49	107
9	2	5	49	144
10	1	7	39	98

** Conditional, Technically-Recoverable, Millions of Barrels Energy-Equivalent (Mmboe), from "PSRK.out" file*

F95 = 95% chance that resources will equal or exceed the given quantity

F05 = 5% chance that resources will equal or exceed the given quantity

BOE = total hydrocarbon energy, expressed in barrels-of-oil-equivalent, where 1 barrel of oil = 5,620 cubic feet of natural gas

Table 2

Table 3 lists the risked, undiscovered technically recoverable oil and gas resources (also presented in tbl. 2) broken down by commodity for the 4 individual plays. Table 4 reports the detailed results of the basin resources by commodity at multiple fractiles. Norton Basin assessment results are shown graphically in cumulative probability format in figure 8.

References Cited

DesAutels, D.A. 1988, Exploration Evaluation of Hydrocarbon Potential from Norton Basin, Alaska: Bulletin des Centres de Rescherches Exploration-Production, Elf-Aquitane, v. 12, n.2, p. 513-531.

Turner, R.F., Bolm, J.G., McCarthy, C.M., Steffy, D.A., Lowry, P., Flett, T.O., and Blunt, D., 1983, Geological and Operational Summary, Norton Sound COST 2 well, Norton Sound, Alaska: U.S. Geological Survey Open-file Report 83-557, Turner, R.F. (ed.), 154 p.

Turner, R.F., Martin, G.C., Steffy, D.A., Risley, D.E., Flett, T.O., and Lynch, M.B., 1986, Geologic Report for the Norton Basin Planning Area, Bering Sea, Alaska: Minerals Management Service OCS Report 86-0033, Turner, R.F. (ed.), 179 p.

Zerwick, S.A., 1998, Hope Basin Assessment Province: in: *Undiscovered Oil and Gas Resources, Alaska Federal Offshore (As of January 1995)*, Sherwood K.W. (ed.), Minerals Management Service, OCS Monograph MMS 98-0054, p. 217-225.

Links to Summaries for Individual Plays and Appended Items

Norton Basin Province-Assessment Results by Play (Excel Format)
Norton Basin Province-Assessment Results by Commodity (Excel Format)

Play 1, (Upper Tertiary Basin Fill, Upper Oligocene-Miocene), Norton Basin, Assessment Summary
Play 2, (Mid-Tertiary East Subbasin Fill), Norton Basin, Assessment Summary
Play 3, (Mid-Tertiary West Subbasin Fill), Norton Basin, Assessment Summary
Play ~~3~~ 4, (Lower Tertiary Subbasin Fill), Norton Basin, Assessment Summary
Norton Basin Plays-Assessment Results by Commodity (Excel Format)
Norton Basin Plays-Input Data Tables (Excel Format)
Norton Basin Plays-Pool Size Models (Txt Format)
Norton Basin Plays-Simulation Pool Statistics (Excel Format)

2006 Assessment Results for Norton Basin OCS Planning Area

Risked, Undiscovered, Technically Recoverable Oil and Gas Resources, as of November 2005

		BOE Resources (Mmbo)			Oil Resources (Mmbo)			Gas-Condensate Liquid Resources (Mmbo)			Free* Gas Resources (Tcfg)			Solution Gas Resources (Tcfg)			Total Liquid Resources (Mmbo)			Total Gas Resources (Tcfg)		
Play Number	Play Name	F95	Mean	F05	F95	Mean	F05	F95	Mean	F05	F95	Mean	F05	F95	Mean	F05	F95	Mean	F05	F95	Mean	F05
1	Upper Tertiary Basin Fill	0	139	626	0	0	0	0	13	58	0.000	0.709	3.192	0.000	0.000	0.000	0	13	58	0.000	0.709	3.192
2	Mid-Tertiary East Subbasin Fill	0	66	352	0	0	0	0	6	33	0.000	0.334	1.794	0.000	0.000	0.000	0	6	33	0.000	0.334	1.794
3	Mid-Tertiary West Subbasin Fill	0	382	1,551	0	0	0	0	36	146	0.000	1.944	7.896	0.000	0.000	0.000	0	36	146	0.000	1.944	7.896
4	Lower Tertiary Subbasin Fill	0	14	77	0	0	0	0	1	7	0.000	0.072	0.392	0.000	0.000	0.000	0	1	7	0.000	0.072	0.392
Sum of All Plays**		**0**	**601**	**2,606**	**0**	**0**	**0**	**0**	**56**	**244**	**0.000**	**3.058**	**13.273**	**0.000**	**0.000**	**0.000**	**0**	**56**	**244**	**0.000**	**3.058**	**13.273**

** Free gas, occurring as gas caps associated with oil and as oil-free gas pools (non-associated gas).*

*** Values as reported out of Basin Level Analysis-Geologic Scenario aggregation module in GRASP, "Volume Ordered" aggregation option. Total liquids and total gas values were obtained by summing resource values for means and fractiles of component commodities. Play resource values are rounded and may not sum to totals reported from basin aggregation.*

BOE, total energy, in millions of barrels (5,620 cubic feet of gas per barrel of oil, energy-equivalent); Mmbo, millions of barrels of oil or liquids; Tcfg, trillions of cubic feet of natural gas

Table 3. Summary of Norton basin province assessment results for ultimate technically recoverable resource (UTRR) by play, 2006 assessment.

Province Resources - Technically Recoverable, Risked, By Product

Geological Resources Assessment Program-GRASP-Version 8.29.2005

The	Current	UAI	AAAAAI			
	is	for				
World	Level	-	World	Level	Resources	
Country	Level	-	UNITED	STATES	OF	AMERICA
Region	Level	-	MMS	-	ALASKA	REGION
Basin	**Level**	**-**	**NORTON**	**BASIN**		

Basin Level Aggregation of Risked, Technically Recoverable Resources By Product (Province Aggregation ".out" file)

Volume Ordered (Play Aggregation Method)
RandomSeed = 42183
Number of Trials = 10000

Greater Than Percentage	BOE (Mboe)	Oil (Mbo)	Condensate (Mbc)	Solution Gas (Mmcfg)	Free (Gas Cap & Nonassociated) Gas (Mmcfg)
99	0	0	0	0	0
98	0	0	0	0	0
97	0	0	0	0	0
96	0	0	0	0	0
95	0	0	0	0	0
90	0	0	0	0	0
85	0	0	0	0	0
80	0	0	0	0	0
75	0	0	0	0	0
70	0	0	0	0	0
65	0	0	0	0	0
60	0	0	0	0	0
55	0	0	0	0	0
50	0	0	0	0	0
45	0	0	0	0	0
40	284,920.85	0	26,821.70	0	1,450,517.18
35	524,025.87	0	48,780.77	0	2,670,877.50
30	690,565.46	0	64,214.00	0	3,520,095.20
25	914,571.24	0	85,048.35	0	4,661,918.62
20	1,157,669.70	0	108,366.21	0	5,897,085.63
15	1,454,316.84	0	135,655.21	0	7,410,878.36
10	1,868,700.32	0	173,637.05	0	9,526,255.53
5	2,606,032.15	0	244,200.51	0	13,273,493.80
4	2,861,827.21	0	268,325.79	0	14,575,477.94
3	3,193,618.52	0	300,502.87	0	16,259,309.93
2	3,738,228.53	0	357,264.01	0	19,001,020.61
1	4,777,934.32	0	455,238.02	0	24,293,553.21
Mean	600,567.27	0	56,358.95	0	3,058,450.74
Rep	600,400.17	0	53,027.74	0	3,076,233.06
Min	0	0	0	0	0
Max	14,907,902.58	0	1,589,555.27	0	74,849,111.92

Table 4. Detailed report of ultimate technically recoverable resources (UTRR) by commodity, as reported in province aggregation file by *GRASP* computer model, 2006 assessment.

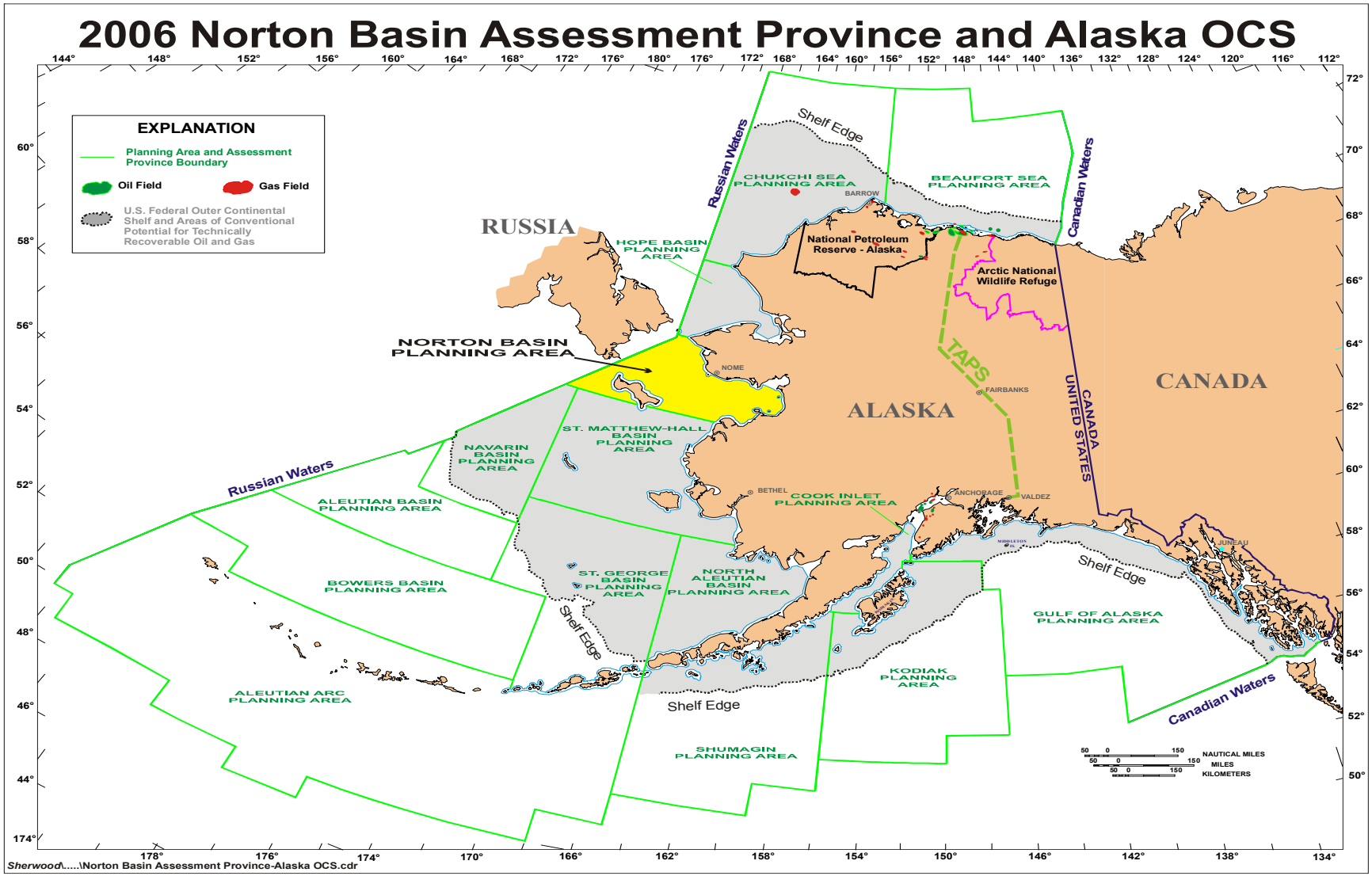

Figure 1. Map of Alaska OCS Planning Area boundaries, showing location of Norton Basin Planning Area highlighted in yellow.

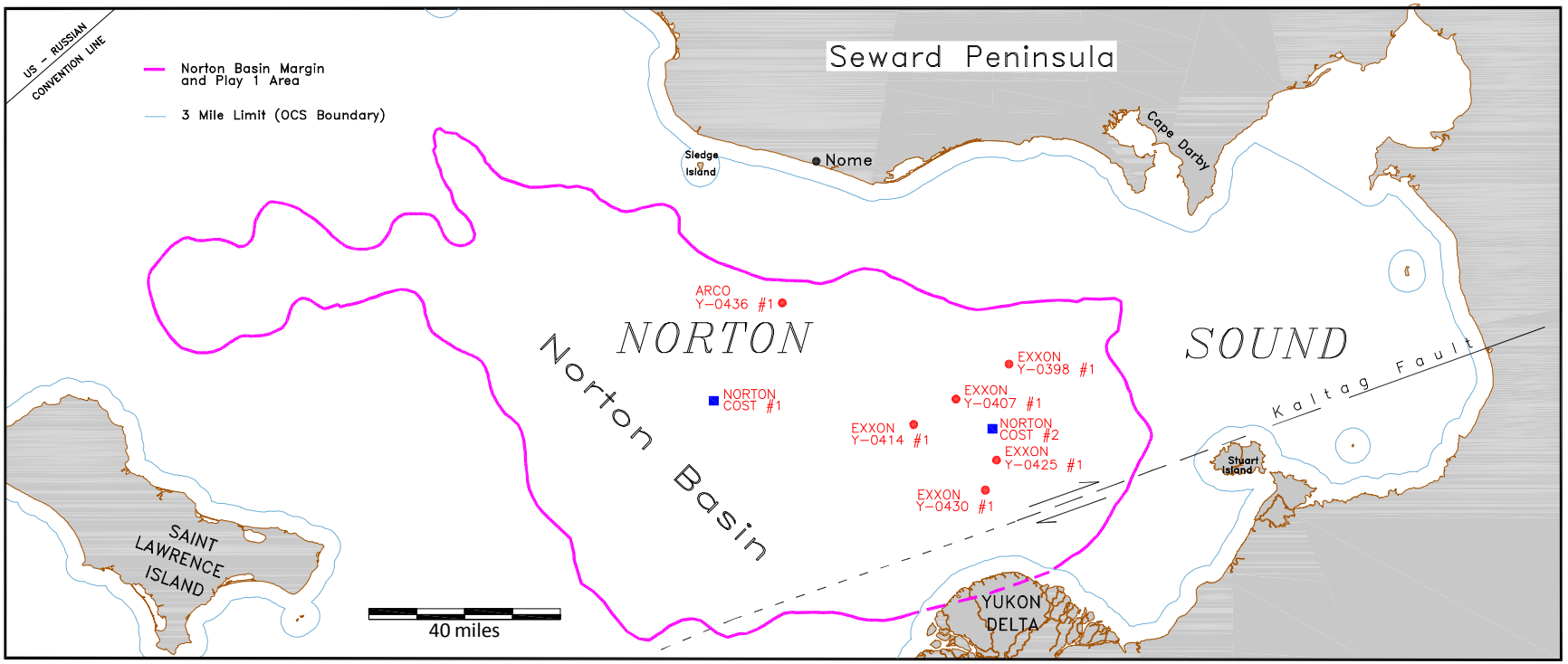

Figure 2. The Norton Basin area. The geologically prospective Norton Basin area is shown outlined in the OCS area south of the Seward Peninsula and northeast of St. Lawrence Island. Also shown are the locations of Norton Basin COST Number 1 well, COST Number 2 well, and the 6 exploratory wells drilled within the basin. The Kaltag Fault, a right-lateral feature that is inferred to have played an early and important role in the formation of the basin, crosses the southeast portion of the map. The basin margin also defines the extent of Norton Basin geologic Play 1, the Upper Tertiary Basin Fill. The Norton Basin assessment did not include any area landward of the 3-mile limit / OCS boundary, shown in blue.

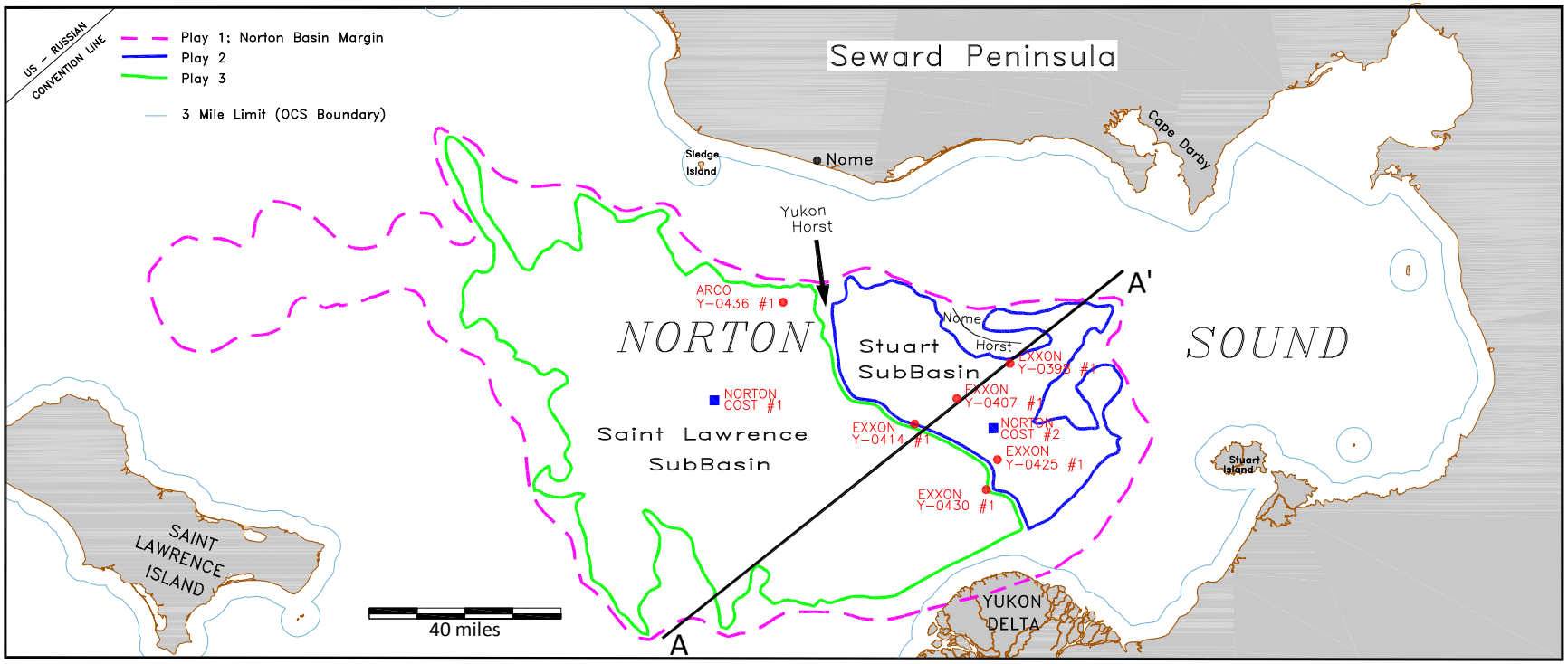

Figure 3. Map of Norton Basin showing the St. Lawrence Subbasin and the Stuart Subbasin separated by the Yukon Horst positive feature. Norton Basin Play 1 (dashed line; the Upper Tertiary Basin Fill) covers the entire Norton Basin area. Play 2 (the Mid-Tertiary East Subbasin Fill) underlies Play 1 and occupies the Stuart Subbasin east of the Yukon Horst. Play 3 (the Mid-Tertiary West Subbasin Fill) also underlies Play 1 and occupies the St. Lawrence Subbasin area on the west. Cross-section A-A' is shown in fig. 4.

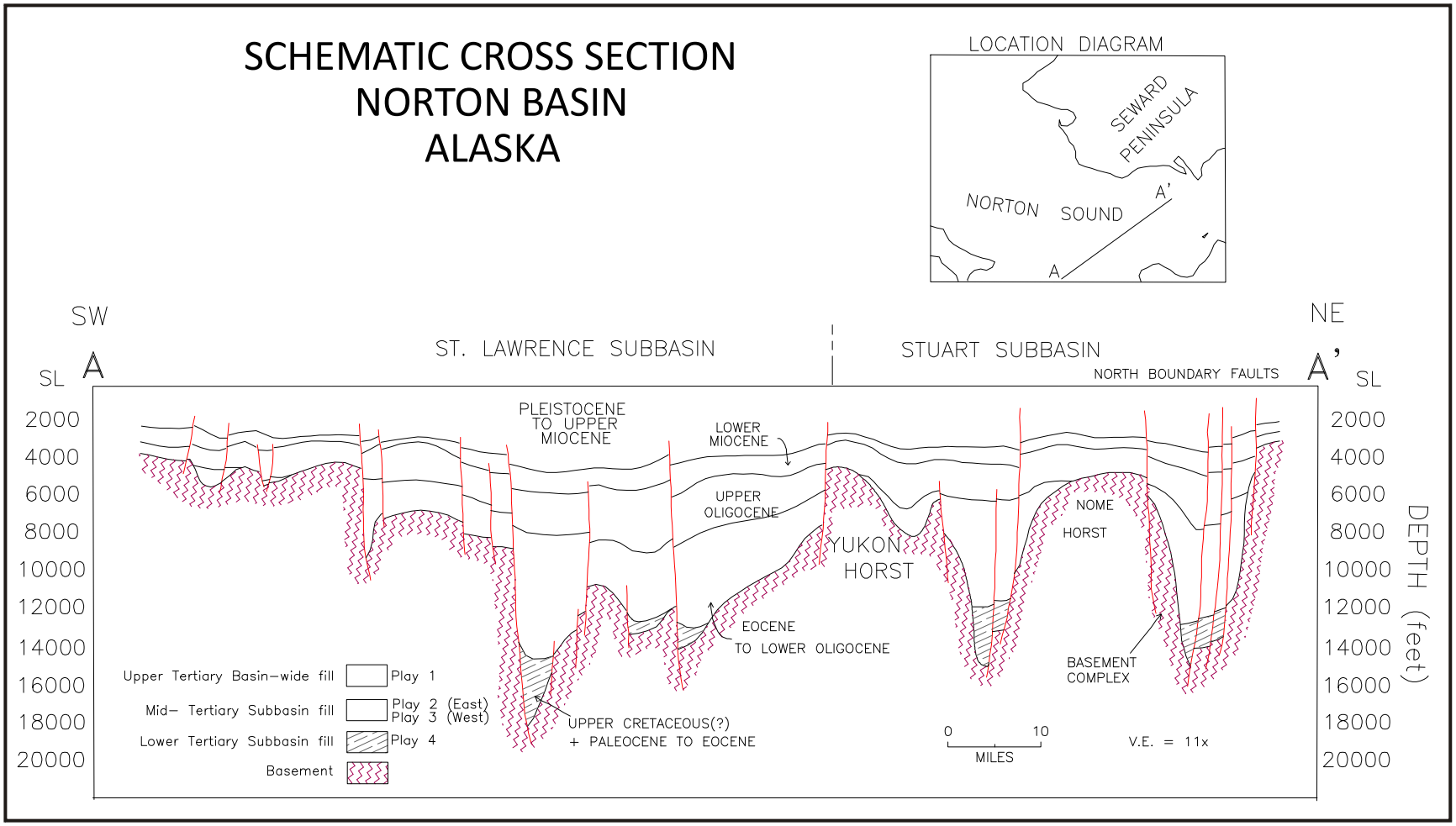

Figure 4. SW-NE Norton Basin conceptual cross-section A-A', based on seismic stratigraphy and well data, illustrates the general basin stratigraphic sequence and structure, along with the spatial relationship of the geologic plays. Shown are structures such as the St. Lawrence and Stuart Subbasins, the Yukon Horst, the Nome Horst, and other features. Play 1 extends across the entire Norton Basin. The Yukon Horst separates Play 2 in the Stuart Subbasin in the east from Play 3 in the St. Lawrence Subbasin in the west (see also fig. 3). Play 4 occurs in both subbasins. Paleozoic to Mesozoic Basement rocks make up the unevaluated Play 5. Vertical exaggeration is about 11 X.

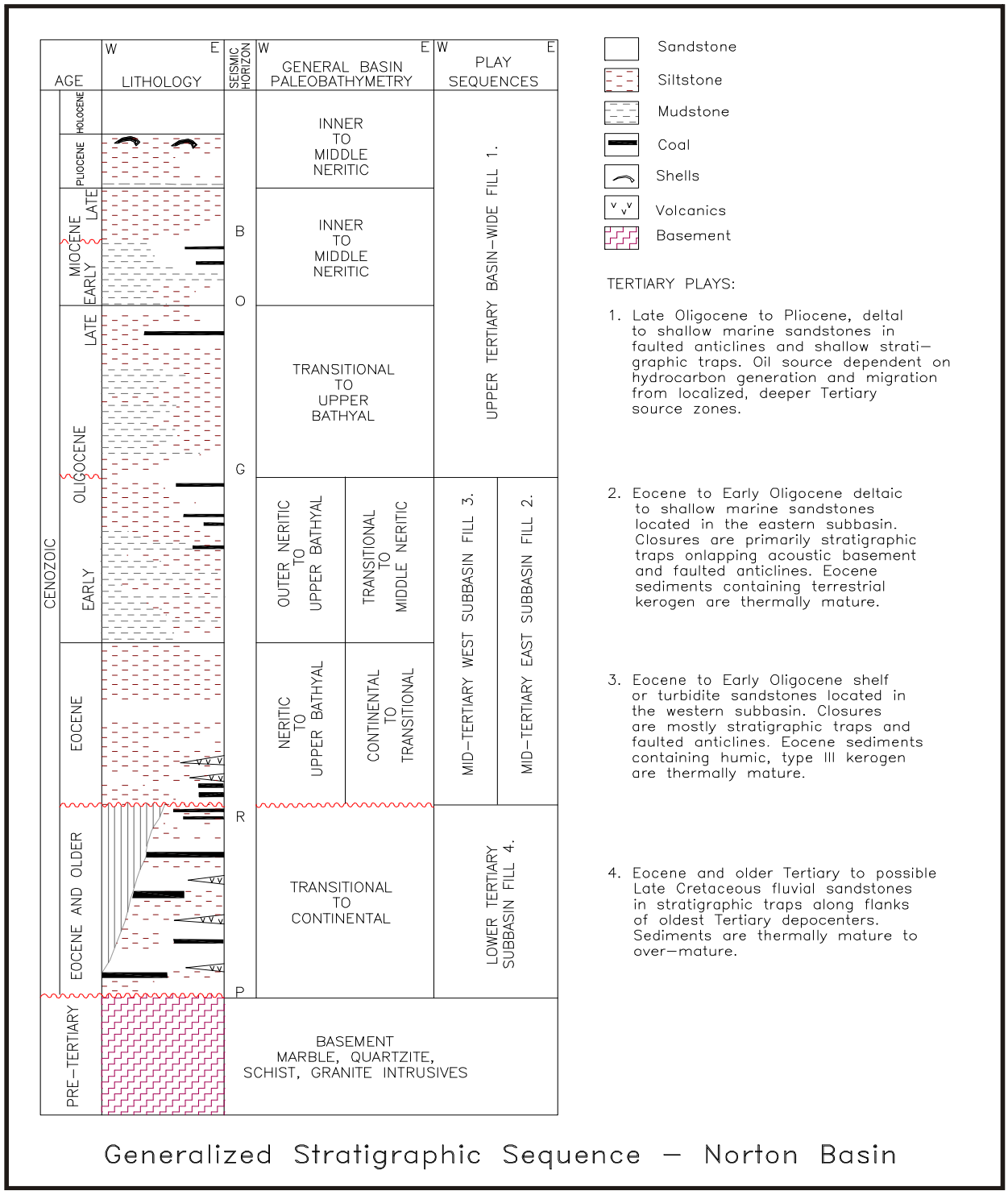

Figure 5. General stratigraphic sequence in Norton Basin with lithologies, paleoenvironments and geologic play sequences. Paleonvironments are subdivided for the East and West Subbasin Plays 2 and 3 (see also figs. 3 and 4).

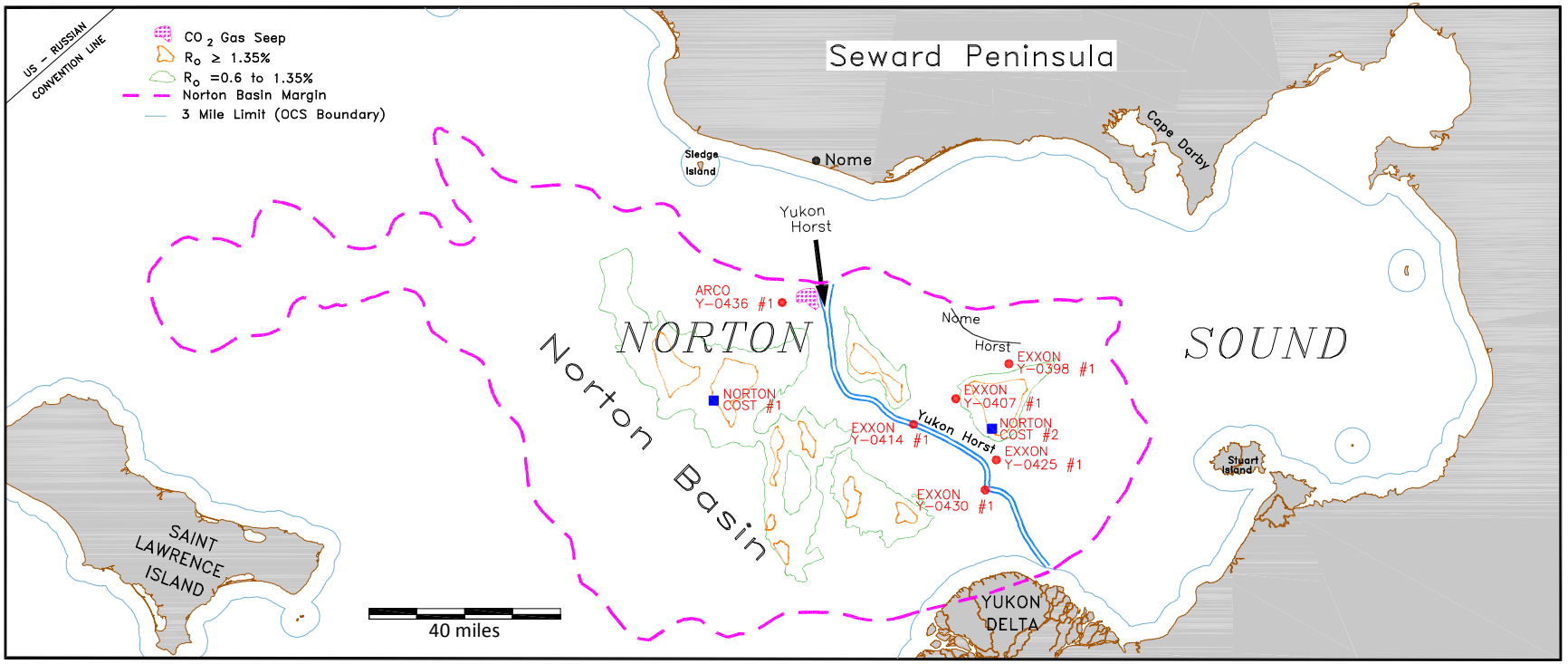

Figure 6. Map outlining the extent of thermally mature potential source rocks in Norton Basin. Thermal maturity is restricted to the deeper parts of the basin.

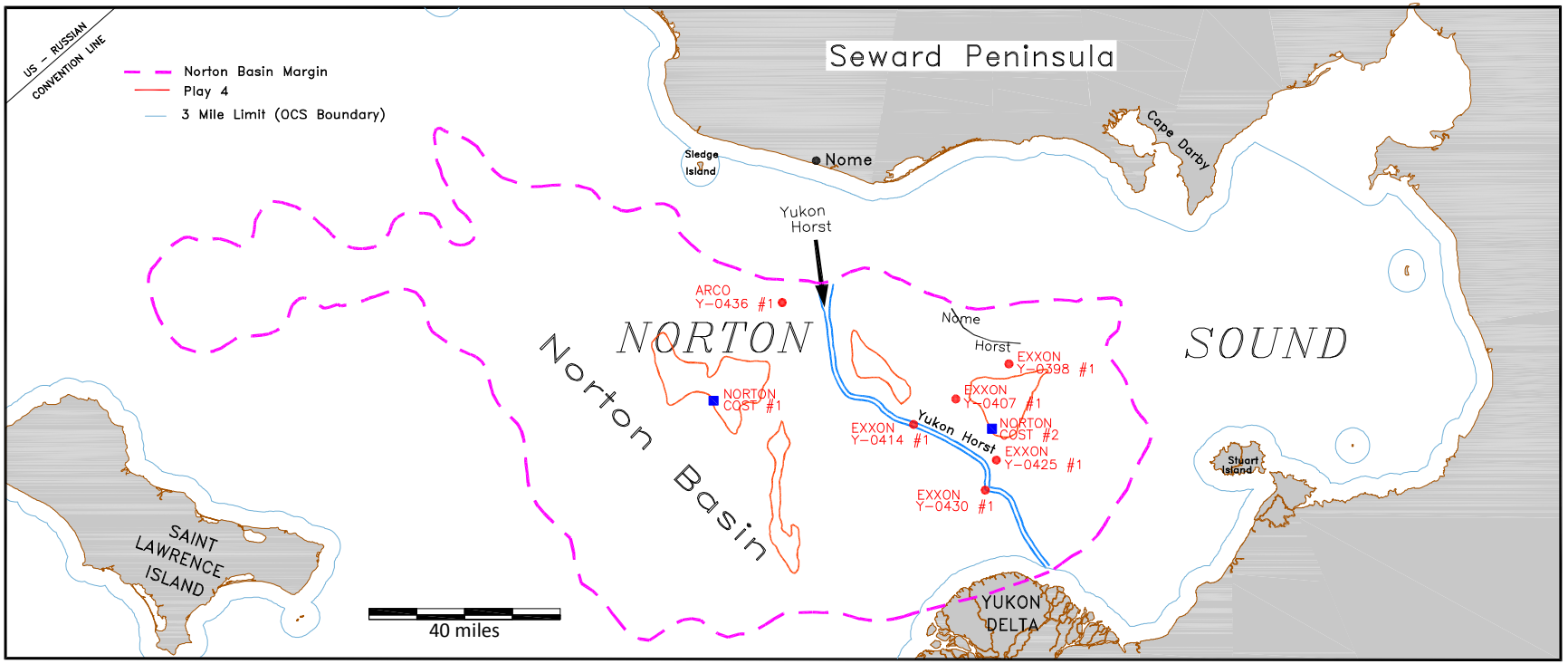

Figure 7. Norton Basin Play 4. Continental to transitional deposits of Latest Cretaceous(?), Paleocene, and early Eocene age that initially filled early subbasin depocenters.

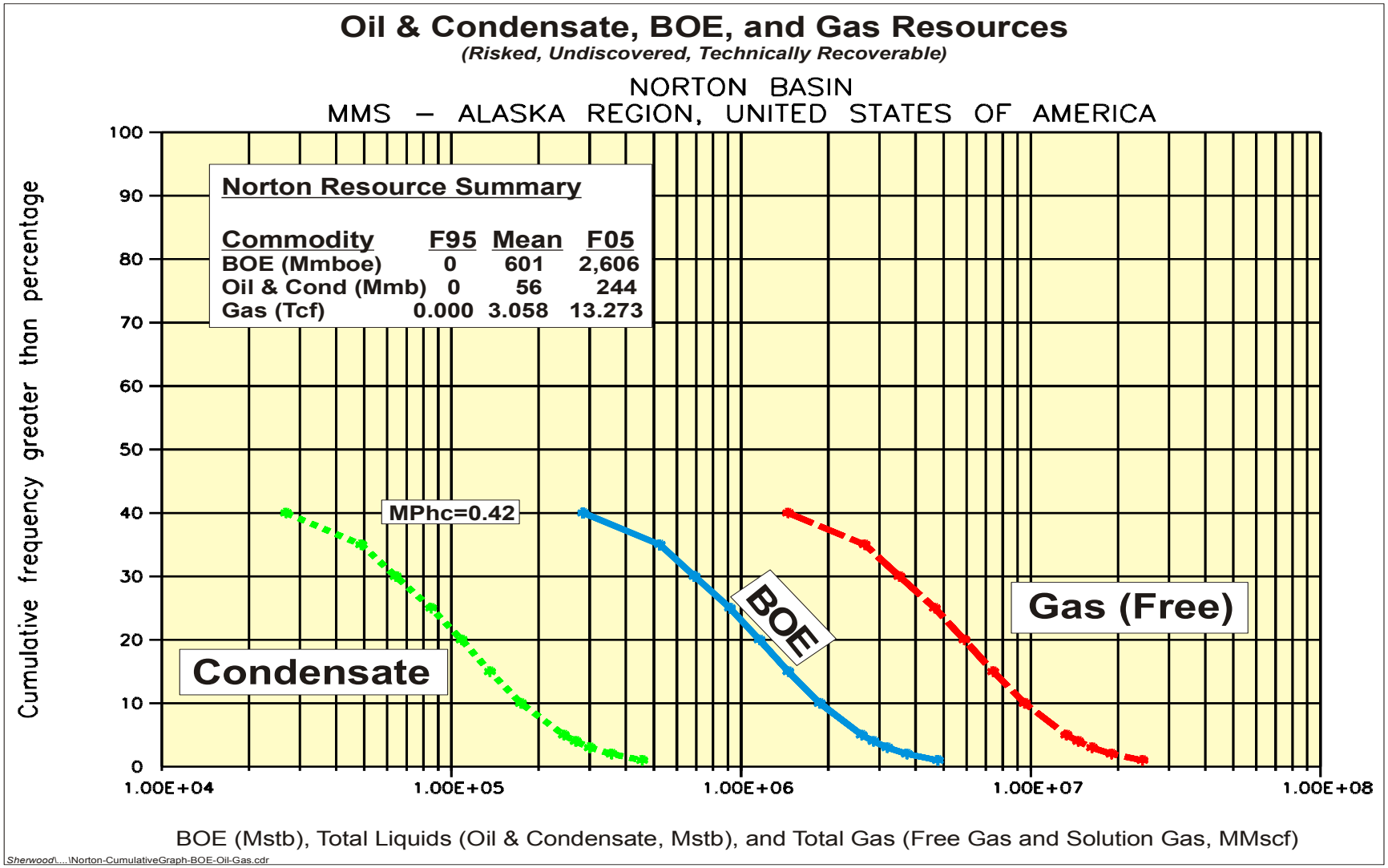

Figure 8. Cumulative probability plot for undiscovered, technically recoverable gas and dissolved condensate resources for the Norton Basin Federal offshore Planning Area and assessment province.

The links to the documents listed on page 6 of this 2006 Norton Basin province summary may not function properly. The documents are found in the downloadable zip file linked under "*Norton Basin Zipped Reports*" at the web page at http://www.boem.gov/About-BOEM/BOEM-Regions/Alaska-Region/Resource-Evaluation/2006-assessment-AK.aspx. The table below correlates the listed reports to the correct support files and folders in the downloadable zip file.

Table for Correlation of Documents Listed on Page 6 of the Norton Basin Province Summary to Files With the .zip file Linked Under "*Norton Basin Zipped Reports*" at the Web Page at http://www.boem.gov/About-BOEM/BOEM-Regions/Alaska-Region/Resource-Evaluation/2006-assessment-AK.aspx

Listed Document	Correlative Source File or Folder in .zip File
Norton Basin Province-Assessment Results by Play (Excel Format)	Norton Basin Province 2006 Assessment Results by Play .xls
Norton Basin Province-Assessment Results by Commodity (Excel Format)	Norton Basin Province 2006 Assessment Results by Commodity.xls
Play 1, (Upper Tertiary Basin Fill, Upper Oligocene-Miocene), Norton Basin, Assessment Summary	Norton_basin_play1_summary.pdf
Play 2, (Mid-Tertiary East Subbasin Fill), Norton Basin, Assessment Summary	Norton_basin_play2_summary.pdf
Play 3, (Mid-Tertiary West Subbasin Fill), Norton Basin, Assessment Summary	Norton_basin_play3_summary.pdf
Play 4, (Lower Tertiary Subbasin Fill), Norton Basin, Assessment Summary	Norton_basin_play4_summary.pdf
Norton Basin Plays-Assessment Results by Commodity (Excel Format)	Folder: Plays-Assessment Results by Commodity
Norton Basin Plays-Input Data Tables (Excel Format)	Folder: Plays-Input Data Tables
Norton Basin Plays-Pool Size Models (Txt Format)	Folder: Plays-Pool Size Models
Norton Basin Plays-Simulation Pool Statistics (Excel Format)	Folder: Plays-Simulation Pool Statistics