Cook Inlet Planning Area (Alaska) – Province Summary

2006 Oil and Gas Assessment

Introduction

The Cook Inlet Planning Area is located in offshore south-central Alaska, as shown in figure 1. The waters of Cook Inlet and Shelikof Strait overlie a large forearc basin situated between the Aleutian trench and the active volcanic arc on the Alaska Peninsula (fig. 2). The Border Ranges fault system separates the forearc basin from a broad accretionary complex on the southeast that extends to the Aleutian trench (fig. 3). The northwestern boundary of the forearc basin is the Bruin Bay fault, which separates the basin from the Alaska-Aleutian Range batholith (Detterman and Reed, 1980).

The Cook Inlet assessment province overlies the forearc basin and extends from the vicinity of Redoubt volcano and Kalgin Island on the north to the southwestern reaches of Kodiak Island on the south. The area of the Cook Inlet assessment province is shown in figure 4.

The Augustine-Seldovia arch, which is oriented east-west, transverse to the main structural trend of the basin, separates the forearc basin into two depocenters (fig. 3). The northern depocenter, in upper Cook Inlet, contains as much as 25,000 feet of Cenozoic strata. The southern depocenter, in lower Cook Inlet and Shelikof Strait, contains a thin Cenozoic section over as much as 36,000 feet of Mesozoic strata. The assessment area for this report is confined to the Federal Outer Continental Shelf (OCS) of lower Cook Inlet and Shelikof Strait. A small part of the Cenezoic depocenter north of the Augustine-Seldovia arch is in the assessment province.

Figure 5 is a stratigraphic column of the major geologic formations in the Cook Inlet basin. Figure 6 is a location map of three cross sections through selected Cook Inlet wells that illustrate some of the stratigraphic and structural relationships of the basin. All of the OCS wells are included in these cross sections except for the Chevron Y-0248 (Cardinal) well in Shelikof Strait.

Cross section A-A’, shown in figure 7, is a southwest-northeast section that illustrates the northward thickening of the Cenozoic strata. The Cenozoic and Mesozoic strata are separated by the Lower Tertiary Unconformity, which deepens more than 8,000 feet from southwest to northeast on this cross section.

Cross section B-B’, shown in figure 8, is a south-north section across the Augustine-Seldovia arch. The Cenozoic strata are nearly 9,000-feet thick in the Pennzoil Starichkof State No. 1 well in the north, and they thin southward to approximately 1,300 feet over the arch. The Cenozoic strata are rarely thicker south of the arch than the 4,000 feet in the southernmost well (Marathon Y-0168) shown on cross section B-B’.

Cross section C-C’, shown in figure 9, is a south-north section through all of the OCS wells that contain Cretaceous nonmarine strata below the Lower Tertiary Unconformity. Most of the Mesozoic section is comprised of marine strata, while the Tertiary section is entirely nonmarine.

Leasing and Exploration

Petroleum exploration in the basin began on the Iniskin Peninsula on the west side of Cook Inlet around 1900. Seven shallow wells were drilled near oil seeps, with no commercial success. In 1903 and 1904, four shallow wells were drilled near oil seeps on the west side of Shelikof Strait near Paule Bay, also with no success. The first oil discovery in the basin was the Swanson River field in 1957. The first non-associated gas discovery was the Kenai field in 1959. Both fields are located onshore on the Kenai Peninsula. The first offshore success was the Middle Ground Shoal field. The initial well blew out as a gas discovery in 1962 and a subsequent well was completed as an oil discovery in 1963 (Boss and others, 1976).

Figure 10 is a map showing the Cook Inlet oil and gas fields. All of the fields discovered in the forearc basin to date are in the Cenozoic depocenter of upper Cook Inlet or adjacent onshore areas. According to the State of Alaska (ADNR, 2006), 1.318 billion barrels of oil (Bbo) and 7.105 trillion cubic feet of gas (Tcfg) were produced in the basin from 1958 through 2005. The State estimates remaining reserves from producing fields and probable, undeveloped fields to be 94.1 million barrels of oil (Mmbo) and 1.648 Tcfg as of December, 2005.

The petroleum reservoirs in upper Cook Inlet are nonmarine sandstones and conglomerates of Tertiary age, although a small amount of oil (332,951 barrels) was produced from fractured Jurassic rocks in the McArthur River field from 1990 to 1999 (AOGCC, 2004). The stratigraphic column in figure 5 shows the reservoir intervals in the Tertiary section. The source rock for the upper Cook Inlet oil fields is thought to be marine siltstone of the Middle Jurassic Tuxedni Group, shown in figure 5 (Magoon and Claypool, 1981). The gas-to-oil (GOR) ratios in the oil pools are low, so gas caps do not occur. Most of the gas produced in the basin is non-associated biogenic methane found in late Miocene to Pliocene sandstone reservoirs (Claypool and others, 1980).

Dissolved gas associated with the oil pools accounted for only 0.546 Tcf of the total gas production through 2003, compared to 6.144 Tcf of non-associated gas production (Thomas and others, 2004).

The first well drilled in Federal waters was the Lower Cook Inlet COST[1] No. 1 well in 1977 (Magoon, 1986). The first Federal leases were offered in Lease Sale CI in October of 1977. Leases were awarded on 87 tracts for a total of $398,471,313. Lease Sale 60 was held in September of 1981 and leases were awarded on 13 tracts for a total of $4,405,899. A resale, RS-2, offered in 1982 received no bids.

Thirteen exploratory wells, one of which was in Shelikof Strait, were drilled in Federal waters between 1978 and 1985 (fig. 4). Three of the exploratory wells were abandoned at shallow depth and redrilled at approximately the same location. All wells were plugged and abandoned. Drill stem tests in two of the wells recovered small amounts of oil from Cretaceous strata, but no commercial discoveries were made.

Lease Sale 149 was held in June of 1997 and two leases were awarded for a total of $253,965. Those two leases are part of the Cosmopolitan Unit, which straddles the State-Federal boundary along the three-mile limit (fig. 10). They are the only Federal leases currently active in the Cook Inlet Planning Area.

Lease Sale 191 was held in 2004, but no bids were received. Lease Sale 199 was scheduled for 2006, but was cancelled for lack of industry interest. The MMS draft proposal for the 2007-2012 leasing program includes the Cook Inlet Planning Area as a "special interest" sale area for 2009 and 2011. MMS will issue a request for nominations and move forward only if there is sufficient industry interest.

---

[1]*Continental Offshore Stratigraphic Test*

Geologic Setting of Cook Inlet

The Cook Inlet forearc basin and the plutonic rocks of the Alaska-Aleutian Range batholith both lie within the Peninsular tectonostratigraphic terrane of southern Alaska (Jones and others, 1987; Nokleberg and others, 1994). The Peninsular terrane, named for the Alaska Peninsula by Jones and Silberling (1979), was a Mesozoic island-arc complex. The Early Jurassic Talkeetna Formation, consisting of andesitic volcanic and reworked volcanogenic sedimentary rocks, is a voluminous record of early arc activity (Detterman and Hartsock, 1966). The Peninsular terrane became amalgamated with the Wrangellia and Alexander terranes to form a composite superterrane by the Late Triassic (Plafker and others, 1989). This superterrane, referred to as the Wrangellia superterrane by Nokleberg and others (1994), collided with continental North America in the Middle to Late Jurassic and was translated northward along strike-slip faults (Wallace and others, 1989). The Wrangellia superterrane was finally accreted to the southern Alaska continental margin by Late Cretaceous time (Plafker and others, 1989).

The Mesozoic section in Cook Inlet, shown in figure 5, is dominated by marine deposits and ranges from Late Triassic through Late Cretaceous in age (Magoon and others, 1976; Fisher and others, 1987). The Cenozoic section includes nonmarine Tertiary strata, Pleistocene glacial deposits, and Holocene to Recent estuarine sediments. As pointed out by Swenson (2002), the stratigraphy of the Tertiary formations cannot be explained by a simple “layer cake” model as once thought. The units are time transgressive and age relationships may vary from one part of the basin to another. The Tertiary formations are defined on lithology and may be, in part, lateral facies equivalents.

Potential Traps

The traps in both the oil and the gas fields of upper Cook Inlet are in Tertiary rocks deformed by faulted anticlines trending northeast-southwest. Structural growth of the anticlines began in the late Miocene and occurred mainly in Plio-Pleistocene time (Boss and others, 1976). Haeussler and others (2000) analyzed folds in several of the fields and found them to be complex and highly variable. According to those authors, the folds are commonly cored by blind faults that extend into the Mesozoic basement. They appear to have developed by right-transpressional deformation of oblique-slip faults. The fold axes of many of the anticlines are offset by strike-slip faults that are transverse to the northeast-southwest structural trend of the basin. Similar structures are present in Federal waters of lower Cook Inlet and Shelikof Strait, although they involve deformation of Mesozoic rocks throughout most of the planning area.

Stratigraphic traps probably occur in fluvial channels and alluvial fans in Tertiary strata north of the Augustine-Seldovia arch. Also, stratigraphic traps probably occur in turbidite fans and marginal-marine fan deltas in Upper Cretaceous strata. All of the discovered fields in upper Cook Inlet and onshore are in structural traps, so the stratigraphic trap concept has not been thoroughly explored anywhere in the forearc basin.

Reservoir Formations

Potential reservoir rocks in Cook Inlet occur in both the Mesozoic and Tertiary sections (fig. 5). The Late Jurassic Naknek Formation contains very thick sandstone and conglomerate beds which were encountered in all but two of the OCS wells. However, Naknek Formation sandstones and conglomerates have uniformly low porosities and permeabilities because of cementation by zeolite minerals, particularly laumontite and heulandite (Franks and Hite, 1980; Bolm and McCulloh, 1986). The top of the Naknek Formation may be an effective economic basement for the Cook Inlet petroleum province, although a small amount of oil was produced from fractured lower Jurassic rocks in the McArthur River field. Preservation of original porosity in Naknek sandstones by early migration is unlikely. The heat flow of the basin is low, typical of forearc basins, and early onset of oil migration is improbable. According to Magoon and Anders (1992), petroleum generation did not likely occur before Late Cretaceous time for Upper Triassic source beds and Late Tertiary time for Middle Jurassic source beds.

Early Cretaceous rocks include marine siltstones, bioclastic limestones or calcarenites, and sandstones. The sandstones have higher quartz contents and the pore spaces are less occluded by zeolite minerals than the underlying Jurassic sandstones. Because of this, the Early Cretaceous section may have good reservoir-rock potential offshore in the Herendeen Formation and marine sandstones of Albian age.

Late Cretaceous strata may have the best reservoir-rock potential in the Mesozoic section. The Kaguyak Formation is 3,000- to 5,000-feet thick and contains mostly marine mudstones and fine-grained sandstones. However, medium to coarse-grained sandstone beds in an ancient submarine fan complex are exposed at the type locality at Kaguyak Bay (fig. 4) on the Alaska Peninsula (Detterman and others, 1996). Fan-delta deposits with relatively porous and permeable sandstone beds also occur in the Upper Cretaceous section in an isolated outcrop near Saddle Mountain (Magoon and others, 1980) and in four of the offshore wells, shown in cross section C-C' (fig. 9). Both submarine fan and fan-delta deposits in this interval may contain good reservoir beds in both stratigraphic and structural traps in the assessment area.

Tertiary strata in the Cook Inlet basin are nonmarine and include sandstone, siltstone, conglomerate, and coal beds with variable amounts of volcanic tuff (fig. 5). The sandstones and conglomerates were deposited in fluvial channels and alluvial fans. The location and configuration of those channels and fans were determined by variation in uplift histories of adjacent tectonic blocks (Swenson, 2002).

The Hemlock Conglomerate of Oligocene age has yielded almost 80 percent of the oil production in upper Cook Inlet. The overlying Tyonek Formation of Miocene age and the underlying West Foreland Formation of Eocene age have yielded the remainder of the oil production. All three formations are potential oil reservoirs in Federal waters in the limited area north of the Augustine-Seldovia arch (fig. 8).

The upper part of the Tyonek Formation is productive for gas in upper Cook Inlet, as is the Beluga Formation of Miocene age (fig. 5). Those two formations are potential gas reservoirs in Federal waters, also limited to the northern part of the assessment area. The Sterling Formation of Pliocene age is a prolific gas producer in upper Cook Inlet, but is too shallow in Federal waters to be prospective. Cross section A-A' (fig. 7) shows the Tertiary strata thinning southward from State waters.

Petroleum Source Rock Potential

The stratigraphic column in figure 5 shows the potential source rock horizons. Upper Triassic limestone beds of the Kamishak Formation exposed on the Alaska Peninsula near Puale Bay appear to have excellent source-rock potential (Wang and others, 1988). Those rocks are high in TOC and they contain oil-prone kerogen types.

They are thought to be responsible for active seeps at Oil Creek southwest of Puale Bay (Magoon and Anders, 1992). Correlative Upper Triassic rocks probably underlie the Cook Inlet assessment province, but are so deeply buried there that they were not penetrated by any of the OCS exploratory wells (located in fig. 4).

The Middle Jurassic Tuxedni Group contains oil-prone source beds in marine siltstones (Magoon and Claypool, 1981). The Tuxedni Group is the source for the more than 1.3 Bbo produced in the upper Cook Inlet fields (Magoon, 1994). Oil generation was initiated during the Tertiary and migration has continued into the Holocene (Magoon and Anders, 1992; Magoon, 1994).

The coal beds and carbonaceous siltstones of the Tyonek, Beluga, and Sterling formations (fig. 5) are the sources for the biogenic methane for the upper Cook Inlet gas fields (Claypool and others, 1980). The Tyonek and Beluga formations are at adequate depths in the northern portion of the Federal assessment area to be potential gas-prone source rocks. According to Van Kooten (2003), about 92 percent of the non-associated gas discovered in the basin is found at depths between 3,000 and 5,100 feet. That depth range corresponds to the optimum temperature for metabolic activity for methane generation given the heat flow of the basin. The cross sections in figures 7 and 8 show the methane-generation zone for the Tertiary gas play.

Oil and Gas Resources of Cook Inlet

Federal waters of the Cook Inlet basin include four plays: (1) the Tertiary oil play, (2) the Mesozoic stratigraphic play, (3) the Mesozoic structural play, and (4) the Tertiary gas play. Data used to model these plays are tabulated in the play summaries. All four plays were quantitatively assessed using the *GRASP* computer model.

Cook Inlet (Federal) 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)	61	1,225	3,469
Total Gas (Tcfg)	0.027	1.201	3.478
Total Liquids (Mmbo)	57	1,012	2,850
Free Gas** (Tcfg)	0.005	0.824	2.416
Solution Gas (Tcfg)	0.021	0.378	1.063
Oil (Mmbo)	56	1,009	2,841
Condensate (Mmbc)	0	3	9

** 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 1 summarizes the 2006 assessment results by commodity for the Cook Inlet Federal offshore, with detailed results by commodity reported in table 4. Table 3 lists the risked, undiscovered technically recoverable oil and gas resources by commodity for the 4 individual plays. Table 2 shows the conditional sizes of the 10 largest pools in the Cook Inlet Federal offshore assessment province. Cook Inlet assessment results are shown graphically in figure 11.

The 2006 oil and gas assessment of Cook Inlet Federal waters forecast resources of 1,012 Mmb of oil and condensate and 1.201 Tcf of gas (mean, risked, technically recoverable resources). At mean values, liquid hydrocarbons comprise up to 83 percent of the resource endowment of Cook Inlet. Oil and condensate resources range up to 3,469 Mmb, and gas resources range up to 3.478 Tcf at fractile F05 (5% chance).

Cook Inlet (Federal) 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	1	50	229	567
2	2	60	225	593
3	3	34	165	435
4	2	34	120	253
5	1	26	118	277
6	4	19	87	214
7	2	22	82	176
8	3	17	79	187
9	1	17	78	175
10	2	15	62	131

** 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

The four plays in Cook Inlet are estimated to contain a maximum of 91 pools. These are predominantly oil pools (no gas cap) with a small minority in plays 2 and 3 being mixed (oil and gas). The exception to this is play 4, which has all gas pools with insignificant condensate. The largest pool in Cook Inlet (tbl. 2), which is in play 1, contains a mean conditional resource of 229 Mmboe, with a maximum (F05) conditional resource of 567 Mmboe. The largest gas pool, which is in play 4, contains a mean conditional resource of 0.489 Tcfg (or 87 Mmboe), with a maximum (F95) conditional resource of 1.2 Tcfg (or 214 Mmboe). Only five pools in Cook Inlet have mean conditional resources exceeding 100 Mmboe (or 0.562 Tcfg).

References Cited

ADNR (Alaska Department of Natural Resources), 2006, Alaska oil & gas report, May 2006: Division of Oil and Gas, Available online at: http://www.dnr.state.ak.us.

AOGCC (Alaska Oil and Gas Conservation Commission), 2004, Statistical report for 2004: Published annually by Alaska Oil and Gas Conservation Commission, 333 W. 7th Ave., Anchorage, Alaska 99501, Available online at: http://www.aogcc.alaska.gov.

Brimberry, D.L., Gardner, P.S., McCullough, and Trudell, S.E., 2002, Kenai Field, the Kenai Peninsula's Largest Gas Field: In: *Geology and Hydrocarbon Systems of the Cook Inlet Basin, Alaska*, Alaska Geologic Society Field Trip Guidebook, p. 21-29.

Clifford, Andy, 2004, The Cook Inlet gas play from the perspective of a small independent working in Alaska: Petroleum News, v. 9, no. 50.

Bolm, J.G., and McCulloh, T.H., 1986, Sandstone diagenesis: In: *Geologic studies of the lower Cook Inlet COST No. 1 well, Alaska Outer Continental Shelf*, Magoon, L.B. (ed.), U.S. Geological Survey Bulletin 1596, p. 51-53.

Boss, R.F., Lennon, R.B., and Wilson, B.W., 1976, Middle Ground Shoal oil field, Alaska: In: *North American oil and gas fields*, Braunstein, J. (ed.), American Association of Petroleum Geologists Memoir 24, p. 1-22.

Claypool, G.E., Threlkeld, C.N., and Magoon, L.B., 1980, Biogenic and thermogenic origins of natural gas in Cook Inlet basin, Alaska: American Association of Petroleum Geologists Bulletin, v. 64, p. 1131-1139.

Detterman, R.L., and Hartsock, J.K., 1966, Geology of the Iniskin-Tuxedni region, Alaska: U.S. Geological Survey Professional Paper 512, 78 p.

Detterman, R.L., and Reed, B.L., 1980, Stratigraphy, structure and economic geology of the Iliamna quadrangle, Alaska: U.S. Geological Survey Bulletin 1368-B, 86 p.

Detterman, R.L., Case, J.E., Miller, J.W., Wilson, F.H., and Yount, M.E., 1996, Stratigraphic framework of the Alaska Peninsula: U.S. Geological Survey Bulletin 1969-A, 74 p.

Fisher, M.A., Detterman, R.L., and Magoon, L.B., 1987, Tectonics and petroleum geology of the Cook-Shelikof basin, southern Alaska: In: *Geology and resource potential of the continental margin of western North America and adjacent ocean basins--Beaufort Sea to Baja California*, Scholl, D., Grantz, A., and Vedder, J.G. (eds.), Houston, Texas, Circum-Pacific Council for Energy and Mineral Resources, v. 6, p. 213-228.

Franks, S.G., and Hite, D.M., 1980, Controls of zeolite cementation in Upper Jurassic sandstone, lower Cook Inlet, Alaska (abs): American Association of Petroleum Geologists Bulletin, v. 64, p. 708-709.

Haeussler, P.J., Bruhn, R.L., and Pratt, T.L., 2000, Potential seismic hazards and tectonics of the upper Cook Inlet basin, Alaska, based on analysis of Pliocene and younger deformation: Geological Society of America Bulletin, v. 112, no. 9, p. 1414-1429.

Jones, D.L., and Silberling, N.J., 1979, Mesozoic stratigraphy, the key to tectonic analysis of southern and central Alaska: U.S. Geological Survey Open-File Report 79-1200, 37 p.

Jones, D.L., Silberling, N.J., Coney, P.J., and Plafker, G., 1987, Lithotectonic terrane map of Alaska (west of the 141st meridian): U.S. Geological Survey Map MF-1874-A, scale 1:2,500,000.

Magoon, L.B. (ed.), 1986, Geologic studies of the lower Cook Inlet COST No. 1 well, Alaska Outer Continental Shelf: U.S. Geological Survey Bulletin 1596, 99 p.

Magoon, L.B., 1994, The Tuxedni-Hemlock(!) petroleum system in Cook Inlet, Alaska, U.S.A.: In: *The petroleum system--from source to trap*, Magoon, L.B., and Dow, W.G. (eds.), American Association of Petroleum Geologists Memoir 60, p. 359-370.

Magoon, L.B., Adkinson, W.L., and Egbert, R.M., 1976, Map showing geology, wildcat wells, Tertiary plant fossil localities, K-Ar age dates, and petroleum operations, Cook Inlet area, Alaska: U.S. Geological Survey Miscellaneous Investigations Series Map I-1019, 3 sheets.

Magoon, L.B., Griesbach, F.B., and Egbert, R.M., 1980, Nonmarine Upper Cretaceous rocks, Cook Inlet, Alaska: American Association of Petroleum Geologists, v. 64, p. 1259-1266.

Magoon, L.B., and Claypool, G.E., 1981, Petroleum geology of Cook Inlet basin, Alaska--An exploration model: American Association of Petroleum Geologists Bulletin v. 65, p. 1043-1061.

Magoon, L.B., and Anders, D.E., 1992, Oil-to-source-rock correlation using carbon-isotopic data and biological marker compounds, Cook Inlet-Alaska Peninsula, Alaska, In: *Biological Markers in Sediments and Petroleum,* Moldowan, J.M., Albrecht, Pierre, and Philp, R.P. (eds.), Prentice Hall, New Jersey, p.241-274.

Nokleberg, W.J., and twenty others, 1994, Tectonostratigraphic terrane and overlap assemblage map of Alaska: U.S. Geological Survey Open-File Report 94-194, 1 sheet, 53 p., scale

1:2,500,000.
Plafker, G., Nokleberg, W.J., and Lull, J.S., 1989, Bedrock geology and tectonic evolution of the Wrangellia, Peninsular, and Chugach terranes along the trans-Alaska crustal transect in the Chugach Mountains and southern Copper River basin, Alaska: Journal of Geophysical Research, v. 94, no. B4, p. 4255-4295.
Swenson, Robert, 2002, Introduction to Tertiary tectonics and sedimentation in the Cook Inlet basin: In: *Geology and Hydrocarbon Systems of the Cook Inlet Basin, Alaska*, Alaska Geological Society Field Trip Guidebook, p. 11-20.
Thomas, C.P., Doughty, T.C., Faulder, D.D., and Hite, D.M., 2004, South-central Alaska natural gas study: U.S. Department of Energy, National Energy Technology Laboratory, Arctic Energy Office, Contract DE-AM26-99FT40575, 207 p.
Van Kooten, Gerry, 2003, Origin of giant gas fields in Cook Inlet, Alaska: climate cooling, glacial loading and bacterial gas (abs.): Alaska Geology, Newsletter of the Alaska Geological Society, v. 34, no. 1.
Wallace, W.K., Hanks, C.L., and Rogers, J.F., 1989, The southern Kahiltna terrane: Implications for the tectonic evolution of southwestern Alaska: Geological Society of America Bulletin, v. 101, p. 1389-1407.
Wang, J., Newton, C.R., and Dunne, L., 1988, Late Triassic transition from biogenic to arc sedimentation on the Peninsular terrane: Puale Bay, Alaska Peninsula: Geological Society of America Bulletin, v. 100, p. 1466-1478.

Links to Summaries for Individual Plays and Appended Items

Play 1, (Tertiary Oil Play), Cook Inlet, Assessment Summary

Play 2, (Mesozoic Stratigraphic Play), Cook Inlet, Assessment Summary

Play 3, (Mesozoic Structural Play), Cook Inlet, Assessment Summary

Play 4, (Tertiary Gas Play), Cook Inlet, Assessment Summary

Cook Inlet Plays-Assessment Results by Commodity (Excel Format)

Cook Inlet Plays-Input Data Tables (Excel Format)

Cook Inlet Plays-Pool Size Models (Txt Format)

Cook Inlet Plays-Simulation Pools-Statistics (Excel Format)

Cook Inlet Province-Assessment Results (Excel Format)

2006 Assessment Results for Cook Inlet (Federal) 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	**Tertiary-Oil**	0	358	1,034	0	336	967	0	0	0	0.000	0.000	0.000	0.000	0.126	0.377	0	336	967	0.000	0.126	0.377
2	**Mesozoic-Stratigraphic**	0	377	1,203	0	348	1,107	0	1	5	0.000	0.028	0.099	0.000	0.130	0.409	0	349	1,113	0.000	0.157	0.508
3	**Mesozoic-Structural**	61	354	833	56	325	767	0	2	4	0.005	0.029	0.070	0.021	0.122	0.277	57	327	771	0.027	0.151	0.347
4	**Tertiary-Gas**	0	136	400	0	0	0	0	0	0	0.000	0.767	2.247	0.000	0.000	0.000	0	0	0	0.000	0.767	2.247
Sum of All Plays**		**61**	**1,225**	**3,469**	**56**	**1,009**	**2,841**	**0**	**3**	**9**	**0.005**	**0.824**	**2.416**	**0.021**	**0.378**	**1.063**	**57**	**1,012**	**2,850**	**0.027**	**1.201**	**3.478**

** 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 Cook Inlet province assessment results for ultimate technically recoverable resources (UTRR), by play, 2006 assessment.

Province Resources - Technically Recoverable, Risked, By Product

Geological Resources Assessment Program-GRASP-Version 8.29.2005

The	Current	UAI	AAAAAC			
	is	for				
World	Level	-	World	Level	Resources	
Country	Level	-	UNITED	STATES	OF	AMERICA
Region	Level	-	MMS	-	ALASKA	REGION
Basin	**Level**	**-**	**COOK**	**INLET**		

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

Volume Ordered (Play Aggregation Method)

RandomSeed = 122201

Number of Trials = 10000

Greater Than Percentage	BOE (Mboe)	Oil (Mbo)	Condensate (Mbc)	Solution Gas (Mmcfg)	Free (Gas Cap & Nonassociated) Gas (Mmcfg)
99	16,328.87	15,123.95	46.62	5,674.25	835.39
98	30,521.31	27,952.10	170.75	10,036.24	3,443.13
97	42,438.64	38,857.13	237.06	14,432.51	4,363.33
96	52,852.62	48,467.94	262.98	18,202.99	4,960.99
95	61,355.22	56,376.06	253.24	21,279.93	5,279.71
90	95,962.88	87,458.41	567.63	33,095.46	11,509.61
85	124,804.49	114,417.02	616.38	43,642.85	11,270.68
80	148,854.17	137,057.71	609.44	51,003.96	11,867.08
75	173,747.52	159,699.59	819.89	59,807.20	14,534.37
70	309,426.23	257,620.73	921.97	92,295.04	193,670.43
65	415,286.76	334,622.62	1,222.10	124,291.49	322,172.81
60	524,748.11	420,477.36	1,049.88	159,247.74	420,853.50
55	789,497.78	649,567.49	1,674.48	241,919.36	535,078.27
50	966,555.96	795,092.89	2,629.28	295,252.59	653,593.27
45	1,131,481.48	932,940.68	2,942.55	341,961.55	757,300.62
40	1,293,936.89	1,063,620.64	3,571.82	398,142.06	876,161.63
35	1,474,652.78	1,214,066.43	3,310.52	455,311.61	990,578.51
30	1,665,061.99	1,368,034.97	3,962.56	515,590.74	1,131,431.51
25	1,879,085.81	1,541,563.33	4,563.62	595,240.11	1,275,988.63
20	2,125,095.99	1,743,941.03	5,558.58	651,218.10	1,459,633.58
15	2,429,774.80	2,001,488.51	4,684.96	740,253.60	1,640,385.85
10	2,832,439.72	2,320,918.02	7,198.01	870,526.81	1,963,772.29
5	3,469,360.15	2,841,468.25	8,941.93	1,062,986.11	2,415,512.72
4	3,659,247.94	3,001,592.75	8,185.89	1,127,747.52	2,522,269.95
3	3,930,038.31	3,216,588.27	8,343.89	1,236,746.21	2,725,950.33
2	4,309,022.60	3,527,179.01	10,517.05	1,329,160.74	3,005,694.39
1	4,979,498.52	4,087,063.74	9,394.89	1,508,877.52	3,453,806.65
Mean	1,225,405.21	1,008,639.03	3,010.90	377,538.36	823,766.30
Rep	1,225,590.28	1,022,306.21	1,009.82	353,680.38	783,100.93
Min	0	0	0	0	0
Max	9,099,026.58	7,549,514.16	4,286.20	2,650,531.13	6,033,640.30

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

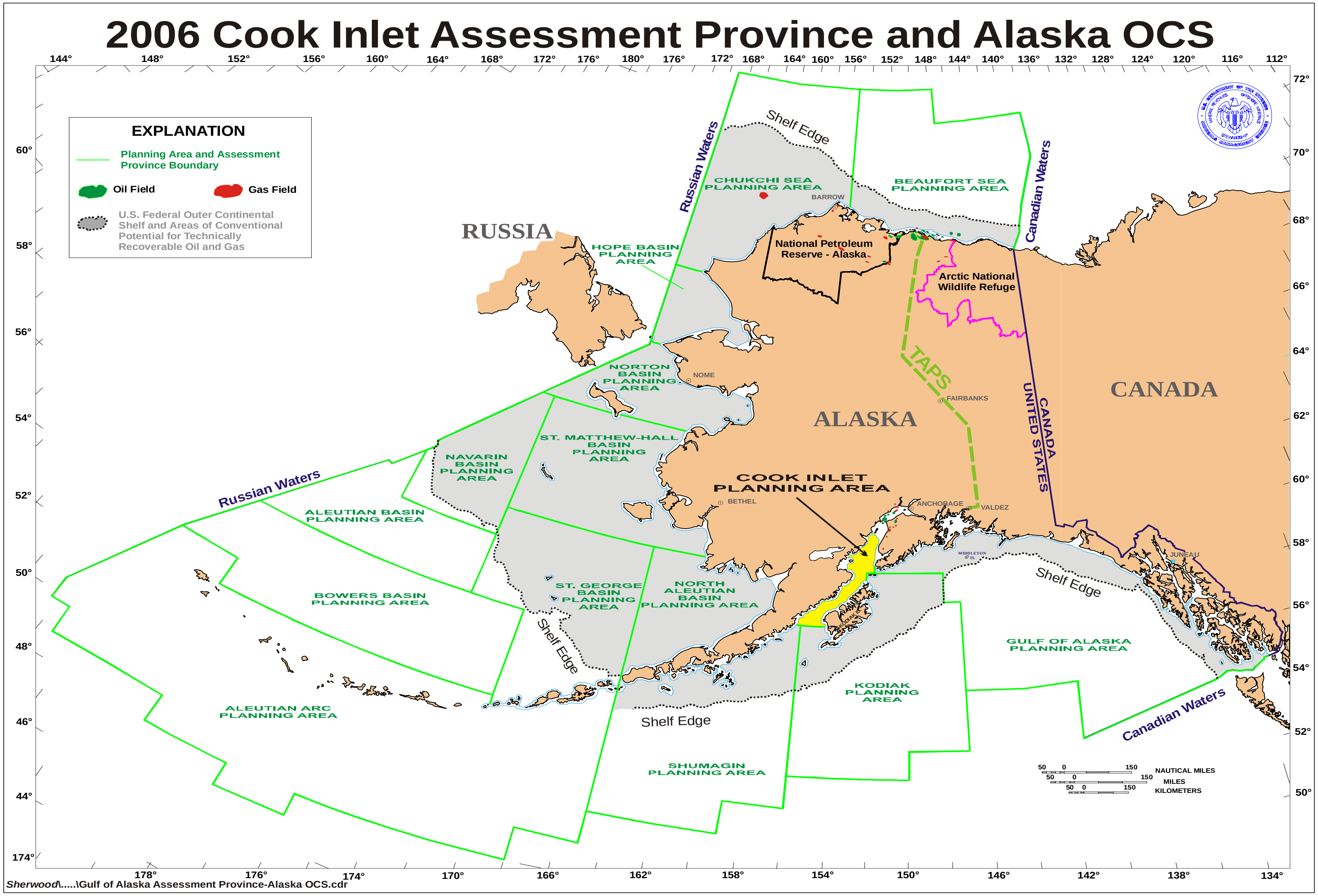

Figure 1. Location map of Cook Inlet Planning Area and assessment province.

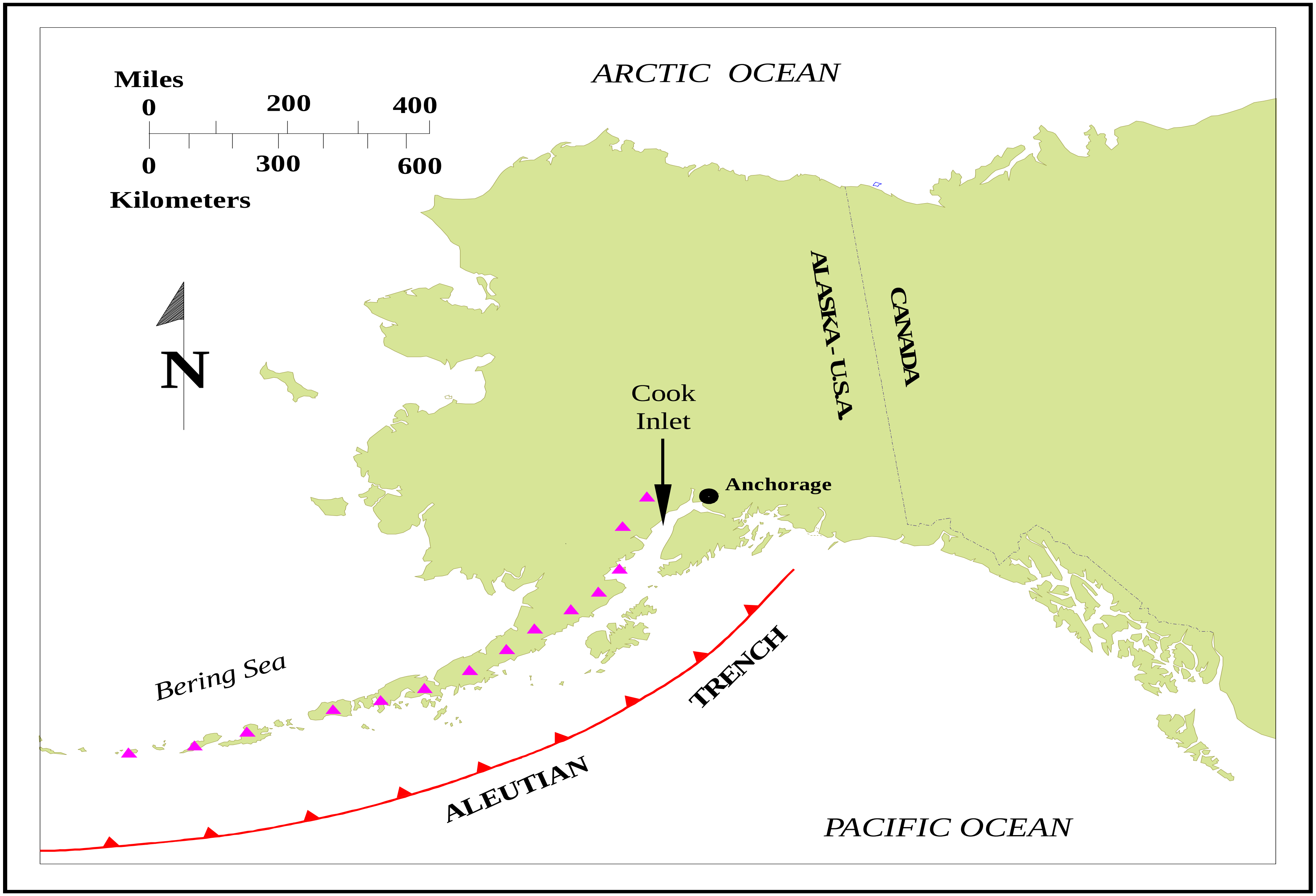

Figure 2. Map showing location of Cook Inlet forearc basin between the Aleutian Trench and the Aleutian volcanic arc (Quaternary volcanoes are located as triangles).

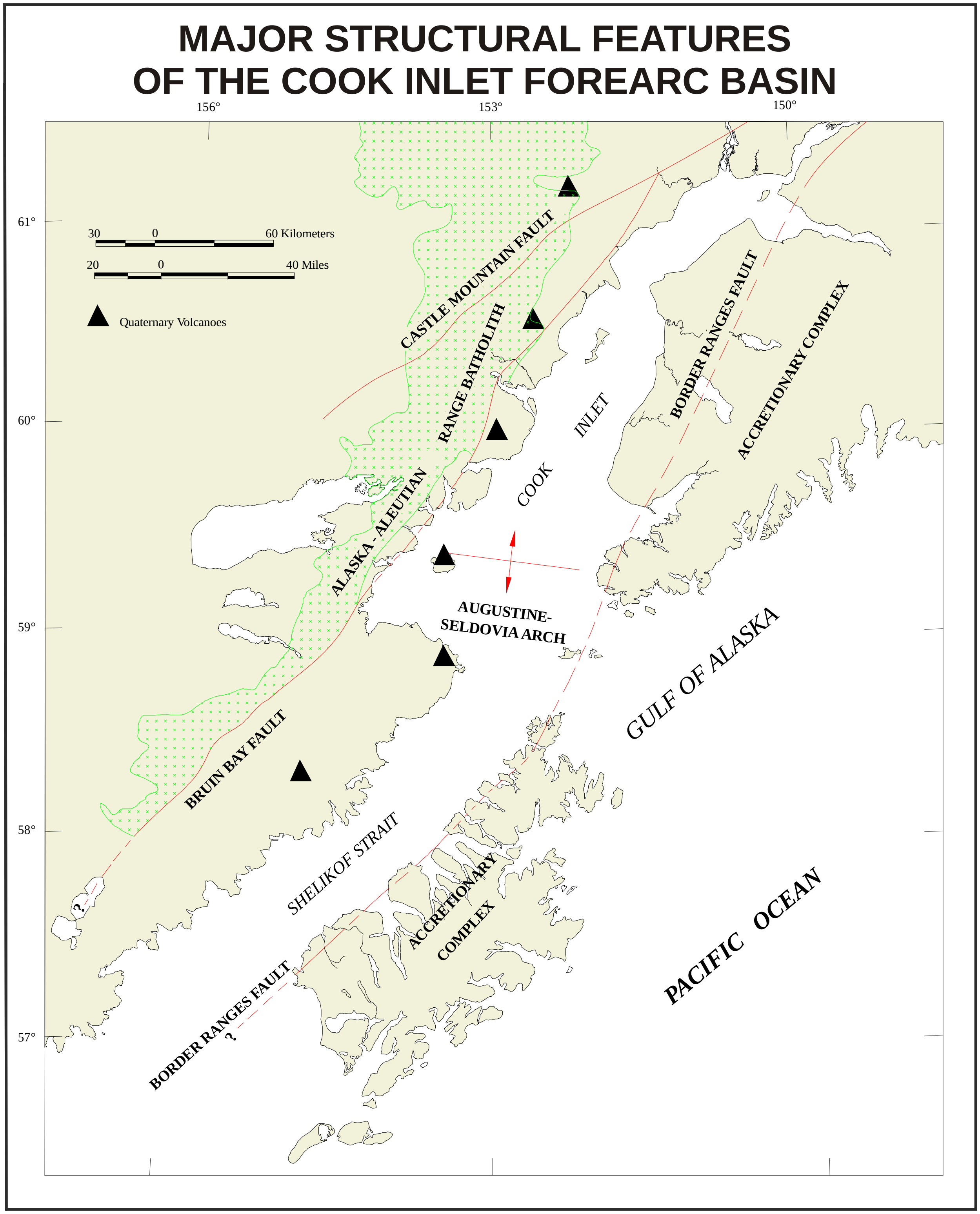

Figure 3. Map showing major structural features of the Cook Inlet forearc basin.

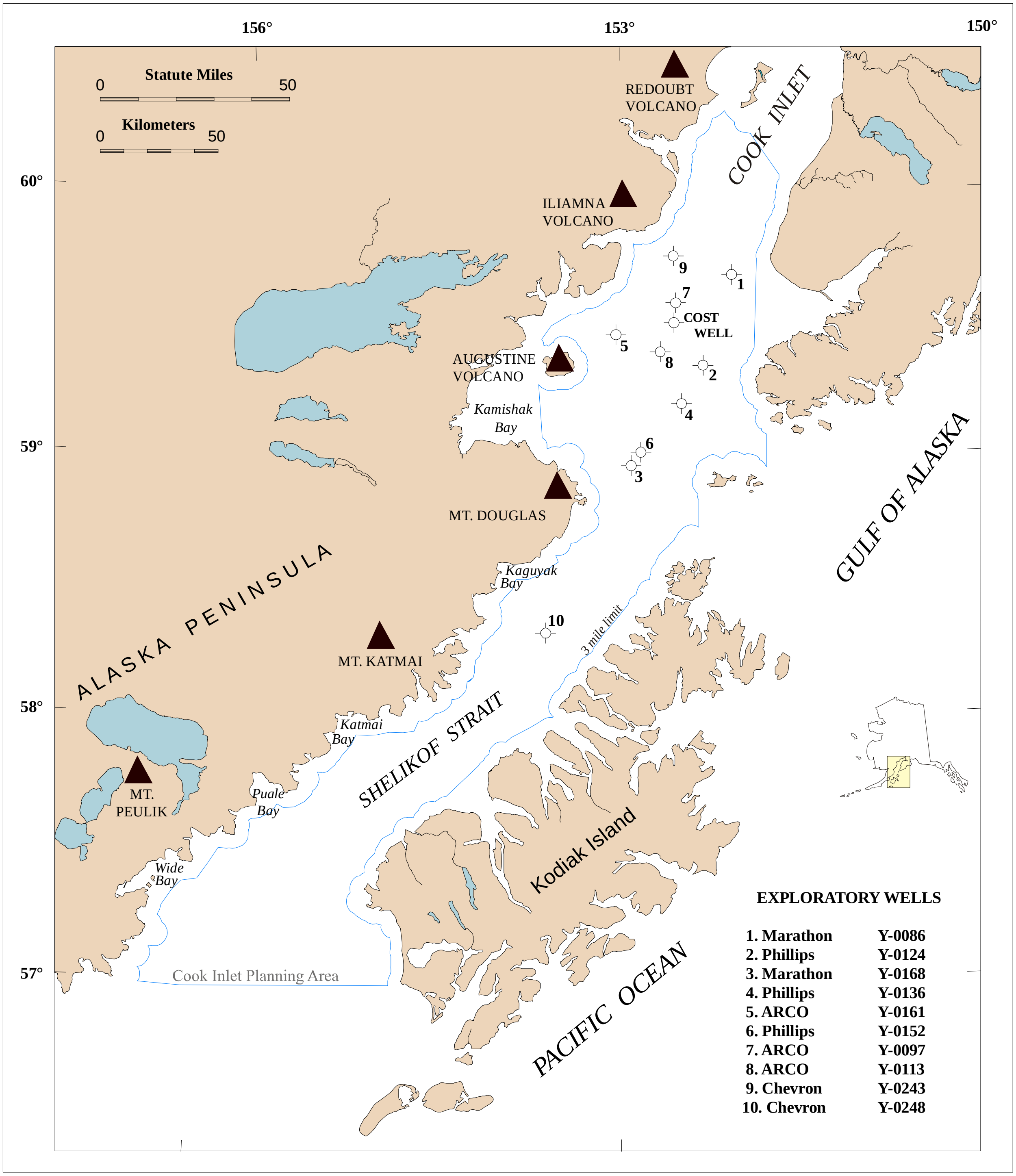

Figure 4. Map showing Cook Inlet assessment province with locations of exploratory wells and stratigraphic test (COST) well.

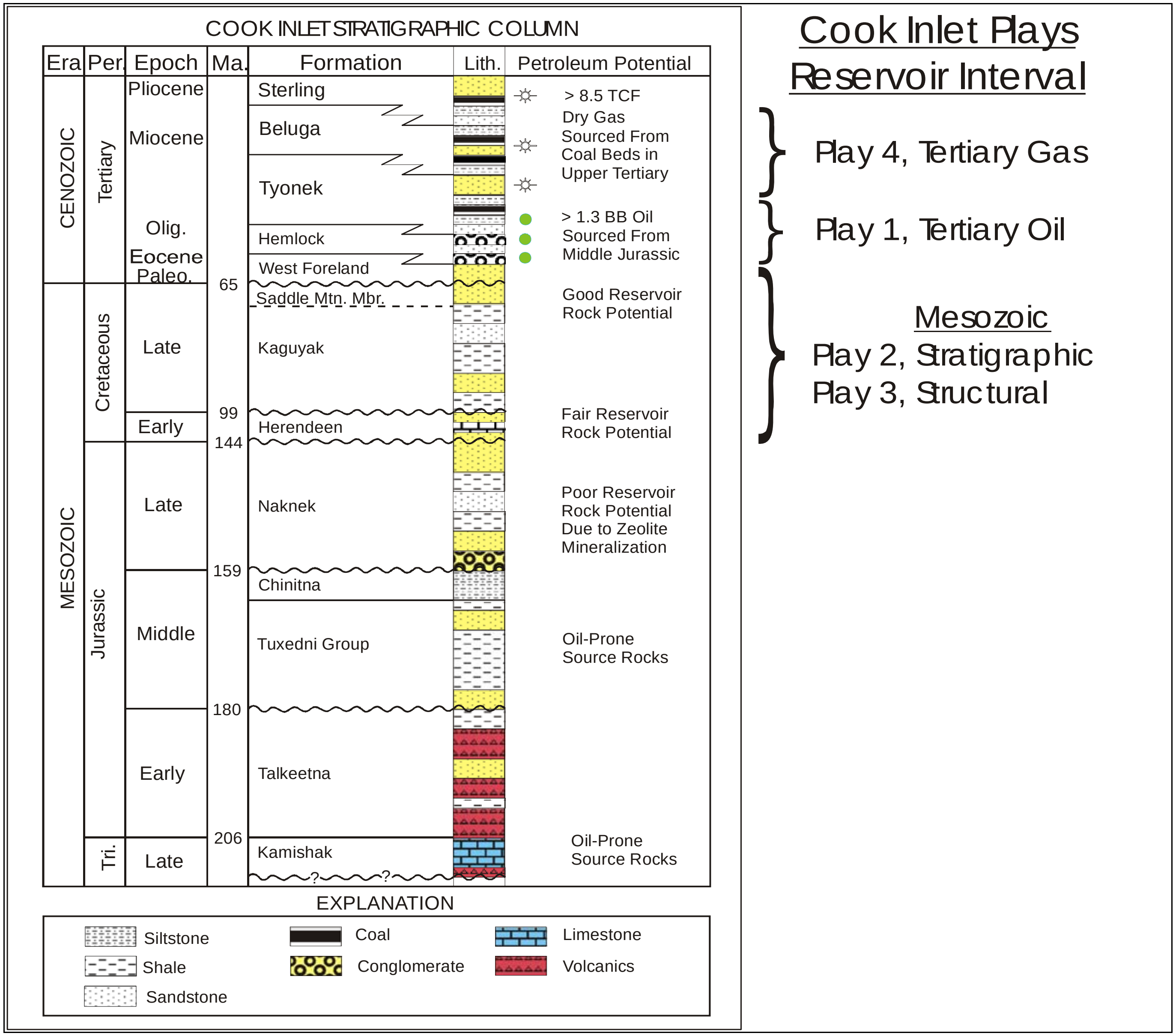

Figure 5. Stratigraphic column for Cook Inlet assessment province.

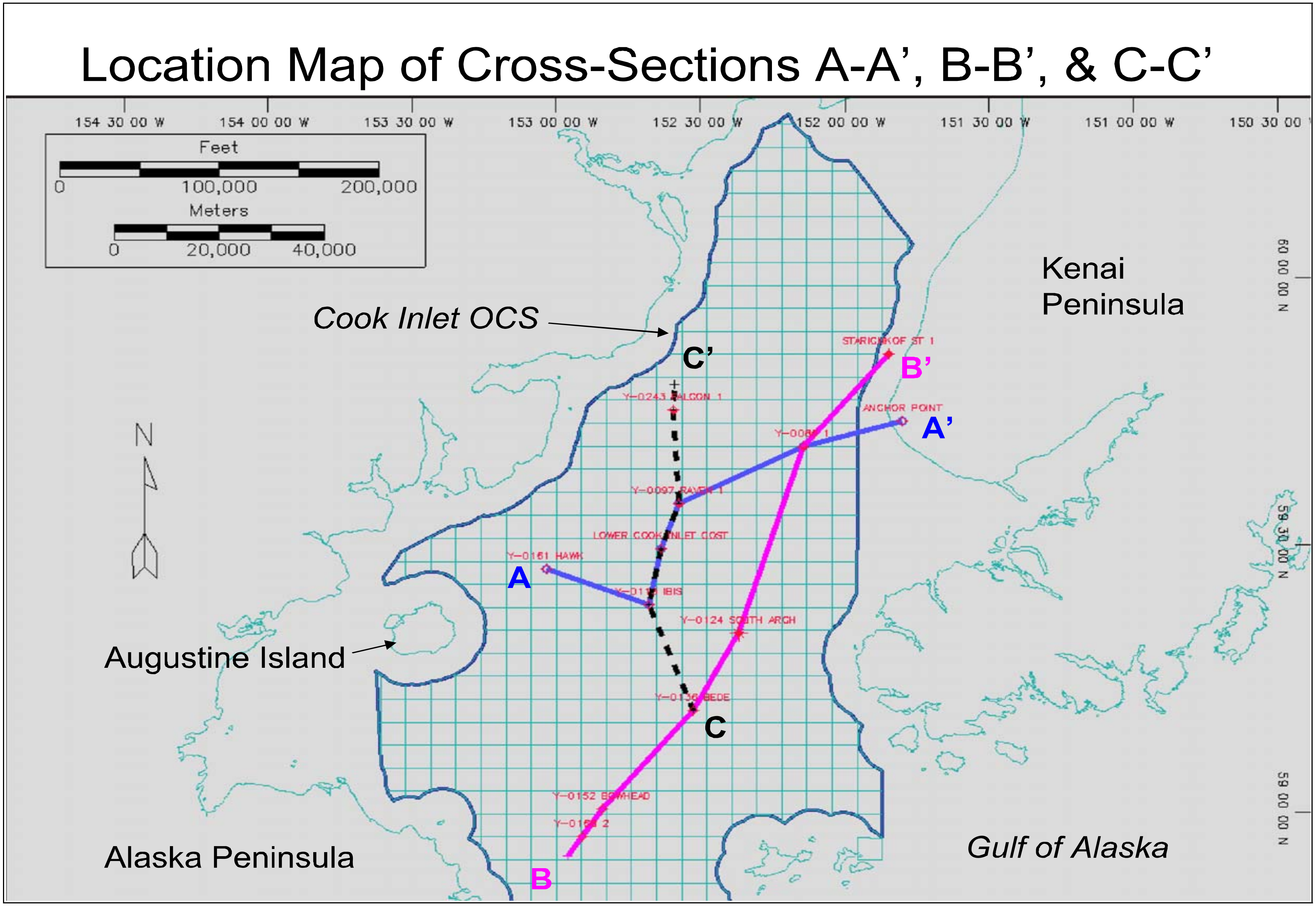

Figure 6. Map showing location of stratigraphic cross-sections through Cook Inlet OCS wells.

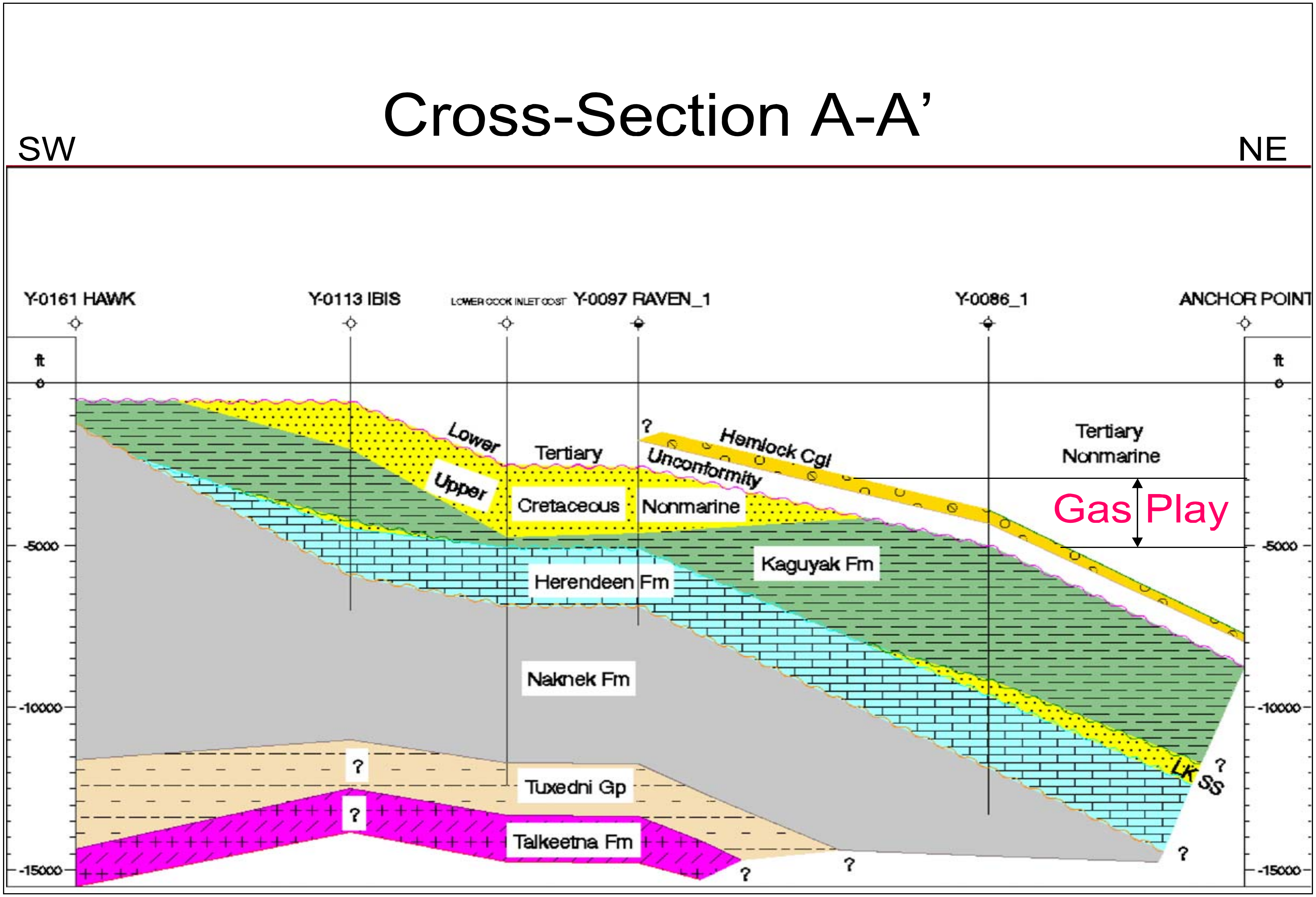

Figure 7. Stratigraphic cross-section A-A' showing northward thickening of sedimentary rocks of Tertiary age and depth range of biogenic gas play in Cook Inlet wells.

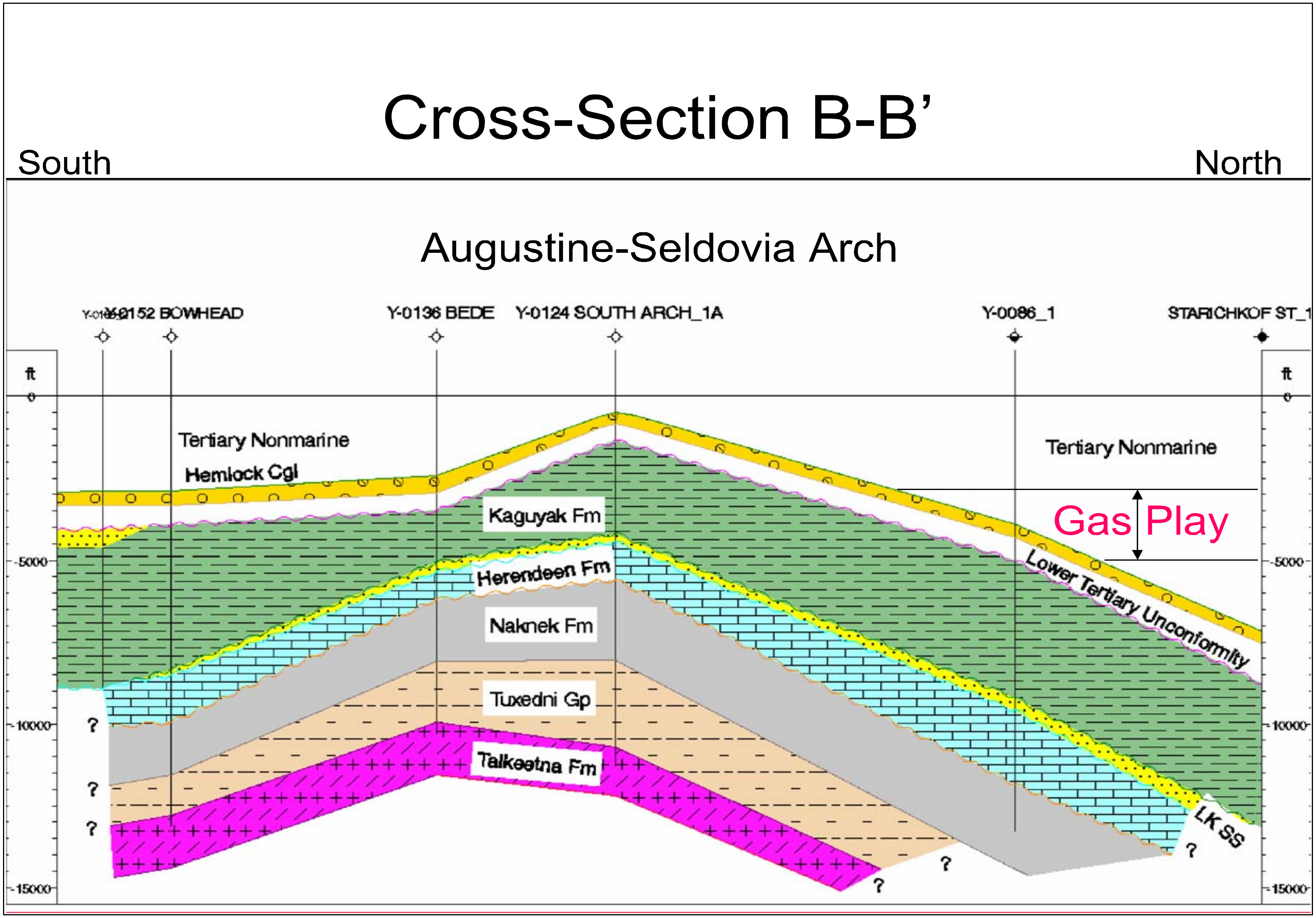

Figure 8. South-North stratigraphic cross-section B-B'showing Augustine-Seldovia arch in Cook Inlet OCS wells.

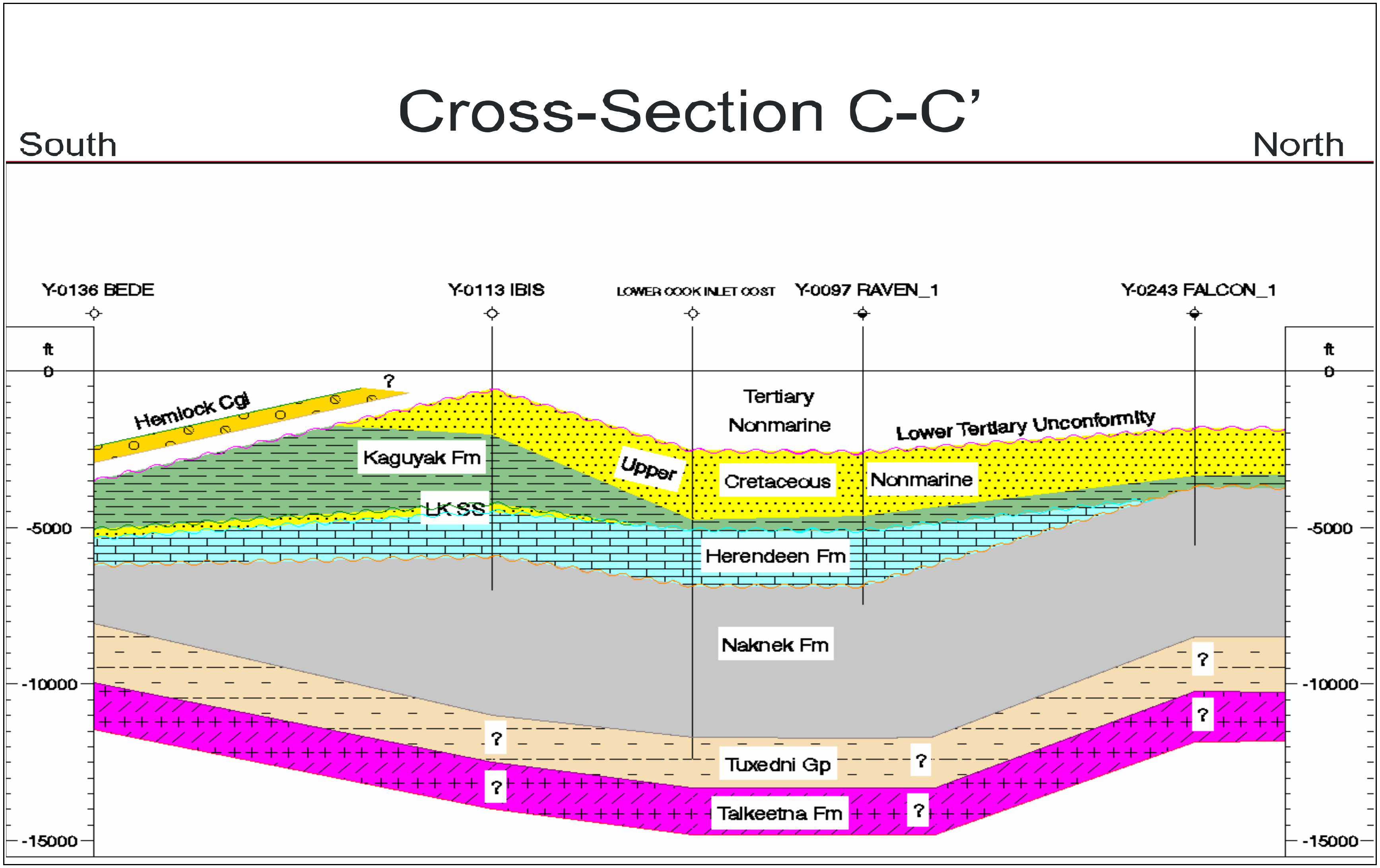

Figure 9. South-North stratigraphic cross-section C-C' showing distribution of Upper Cretaceous, nonmarine sedimentary rocks in Cook Inlet OCS wells.

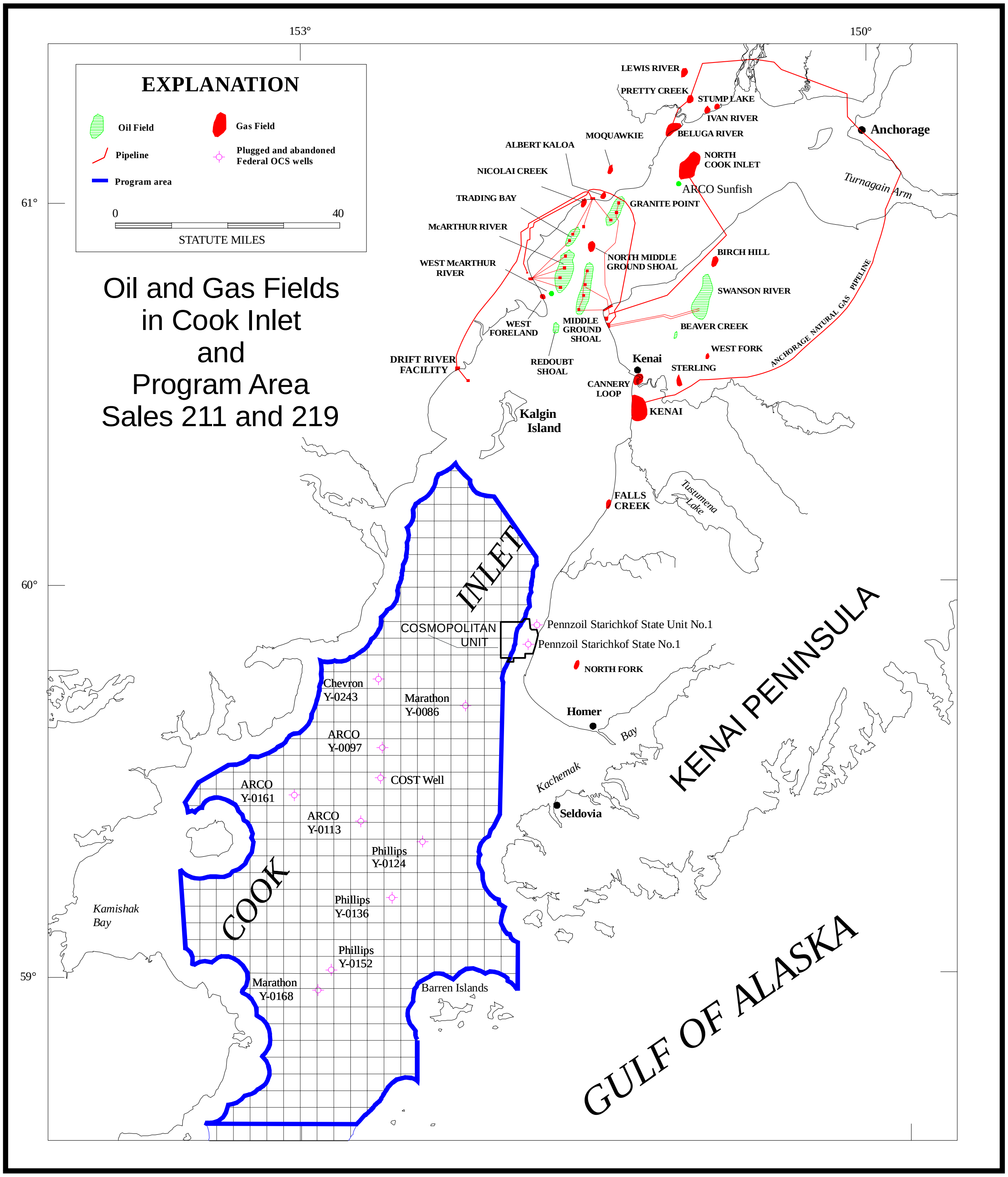

Figure 10. Map showing oil and gas fields and infrastructure of Cook Inlet.

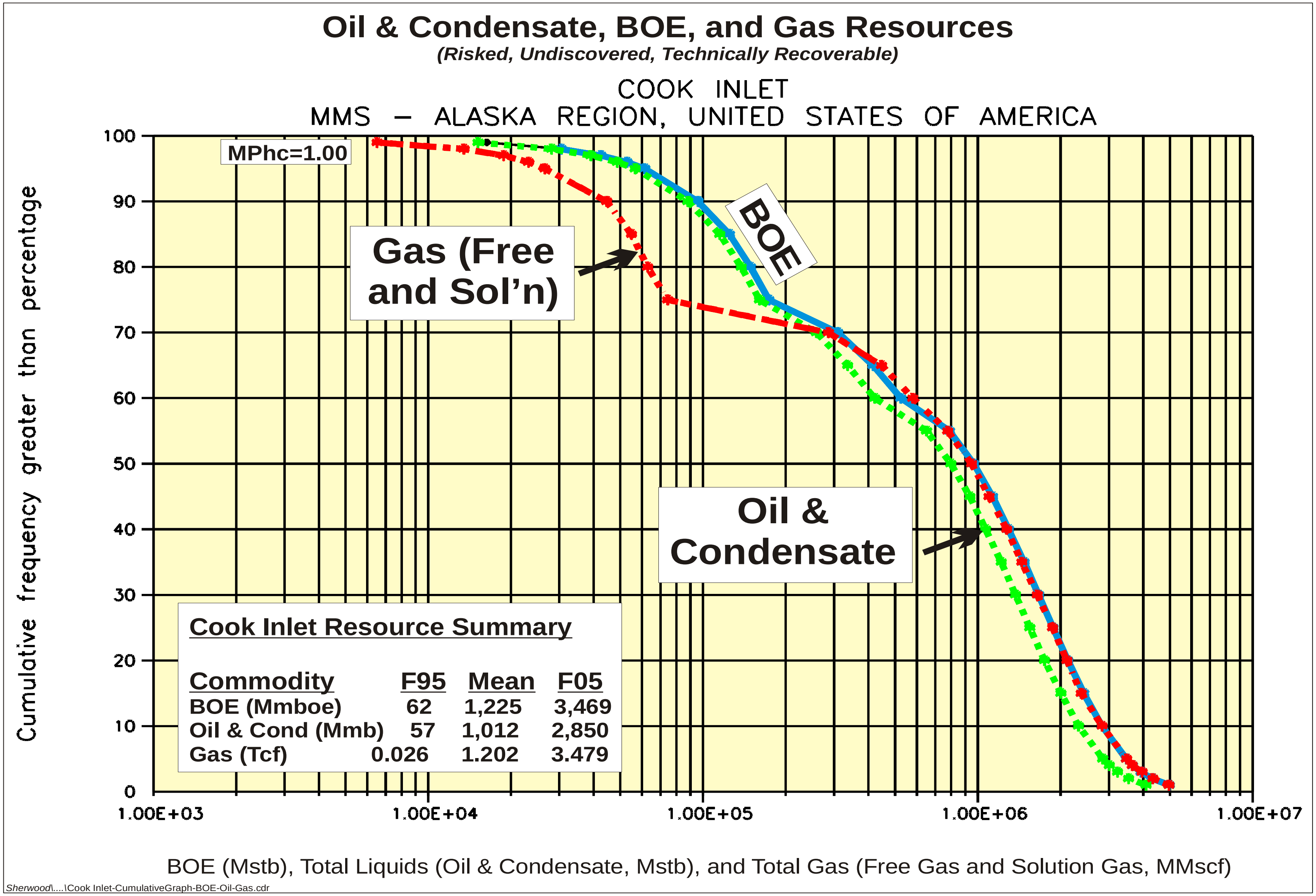

Figure 11. Cumulative probability plot for undiscovered, technically recoverable oil and gas resources for the Cook Inlet Federal offshore Planning Area and assessment province, 2006 assessment.