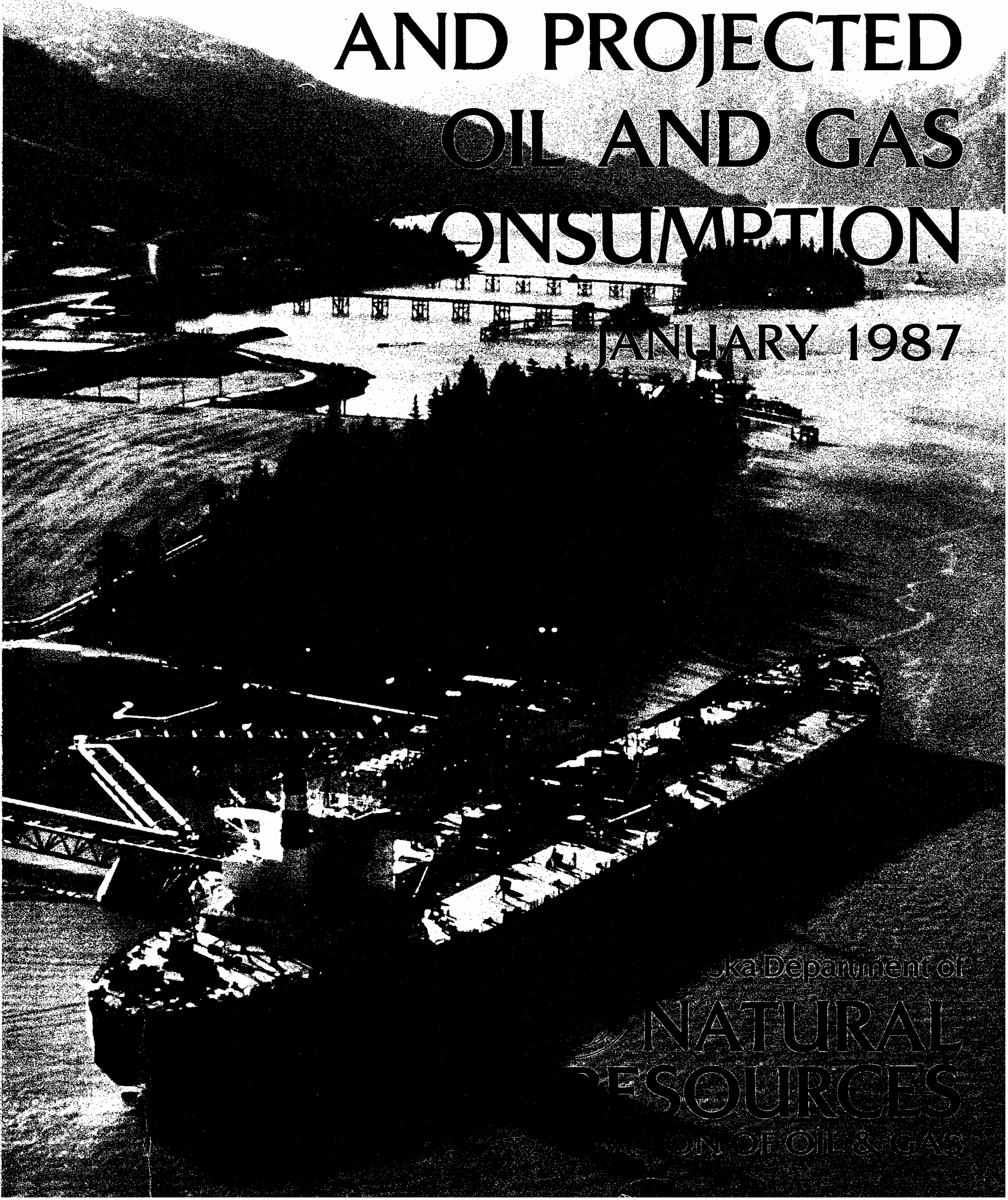
HISTORICAL AND PROJECTED OIL AND GAS CONSUMPTION

JANUARY 1987



Alaska Department of

NATURAL RESOURCES

DIVISION OF OIL & GAS

STATE OF ALASKA

HISTORICAL AND PROJECTED OIL AND GAS CONSUMPTION

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January 1987

Prepared for the First Session
Fifteenth Alaska Legislature

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EXECUTIVE SUMMARY

This report compares estimates of how much oil and gas Alaska has in reserves with estimates of how much oil and gas Alaska will consume in the 15 year period between 1987 and 2001 A revised supply and demand report is issued each year to comply with AS 38.05.183(d), which states:

> "(d) Oil or gas taken in kind by the state as its royalty share may not be sold or otherwise disposed of for export from the state until the commissioner determines that the royalty-in-kind oil or gas is surplus to the present and projected intrastate domestic and industrial needs. The commissioner shall make public, in writing, the specific findings and reasons on which his determination is based and shall, within 10 days of the convening of a regular session of the legislature, submit a report showing the immediate and long-range domestic and industrial needs of the state for oil and gas and an analysis of how these needs are to be met."[1]

Chapter 1 describes the state's royalty oil program, cites sources of past oil and gas disposals, and reviews disposals made during 1985 and 1986.

High, mid and low estimates of oil and gas reserves, and their respective royalty shares, are given in Chapter 2. Whereas high estimates are somewhat probabilistic and assume increasing oil prices, mid and low estimates are derived from proven and probable reserves and assume relatively stable oil prices. These lower figures, therefore, are prudent values for long range policy considerations. The mid range oil estimate is 7.4 billion barrels of oil, yielding a 0.9 billion barrel state royalty share. Of this royalty share, 98.7% is attributable to reserves on the North Slope. The mid range estimate of gas is 35.7 trillion cubic feet. The state's share of this gas is 4.3 trillion cubic feet. Again, 92.1% of the gas is attributed to North Slope reseves.

Production estimates of reserves are also given for the 15 year period. North Slope oil production will peak at about 1.8 million barrels per day in 1987, and then is expected to begin to decline. Production is expected to have declined to about 600,000 barrels per day by the year 2001.

Chapter 3 presents historical data on production and consumption of Alaska oil and gas. Between 1977 and 1986, oil fuel consumption grew 8.9% per year to a total of 1.6 billion gallons in 1986, while in the same period gas consumption grew 2.3% pepr year to 192 billion cubic feet in 1986. These figures are the starting points for the consumption projections detailed in Chapter 4.

Chapter 4 presents forecasts of expected in-state oil and gas consumption from 1987 to 2001. Alaska will consume about 24 billion gallons of fuels and 3.9 trillion cubic feet of gas during that period. Consumption growth rates are forecast to be considerably lower than they have been until now; it is estimated that during the period 1987 to 2001, annual growth will be

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[1] See Appendix E for discussion of statutory definitions.

1% for both oil and gas. The methods and assumptions used to generate the forecasts are included in Appendix B.
In Chapter 5, estimates of state reserves and future production are compared with estimates of future consumption. The comparison shows that for the next 15 years, Alaska's total supply of oil and gas will be greater than in state consumption.

The supply and demand projections used in this report are estimates which are applicable only if their underlying assumptions approximate future events. On the demand side of the equation, in-state consumption will be influenced by economic and population growth which in turn will be influenced by world energy and natural resource prices. For example, development of a new southcentral hydroelectric project (other than Bradley Lake) or a coal-fired electric generation project would dramatically affect the in-state demand for natural gas, particularly after the late 1990s. Future expansion of the natural gas export market would similarly affect in-state natural gas availability as well as prices.

The supply side of the equation also is probabilistic. The mid-range estimates of oil and gas reserves, 7.4 billion barrels and 35.7 trillion cubic feet, respectively, are likely outcomes, though the timing for the development of a natural gas transportation system from the North Slope remains very uncertain and development of certain proven oil and gas fields outside of the existing Prudhoe Bay - Kuparuk infrastructure area does not appear economically feasible at today's oil prices. Estimates of undiscovered resources are highly speculative and of little value for this type of planning or projections. Even if these undiscovered resources exist (which they may not), there is no guarantee that they will be discovered or developed in time (or if ever) to assure long-run continuous hydrocarbon supplies. Major oil firms will search for and develop reserves in response to world market conditions, not because of surplus or deficit conditions in Alaska's relatively small intrastate market.

In summary, reasonable assumptions about Alaska's oil and gas reserves and consumption indicate that not only are current reserves more than adequate to meet the demands of Alaskans for the next 15 years, but that significant quantities are surplus to requirements, and therefore are available for export from the state.

When a landowner sells the right to explore for and develop oil and gas, it usually reserves to itself a percentage of the oil and gas ultimately produced if exploration is successful. That percentage is known as a royalty interest or royalty share. The State of Alaska holds a royalty interest in the lands it has leased for oil and gas exploration and development, and receives royalty payments and "in kind" royalty oil from oil and gas production in Cook Inlet and on the North Slope. The latter royalty production consists chiefly of Prudhoe Bay Unit and Kuparuk River Unit production.

Under Alaska Statutes and the terms of state oil and gas leases, the state can take its royalty share of oil and gas either "in kind" or "in value." When the state takes its share of production in kind, the Commissioner of Natural Resources, acting on behalf of the state, disposes of the oil or gas through negotiated contracts or competitive sales. When royalty shares are taken in value, or in money, individual lessees market the state's share of production along with their equity production and reimburse the state according to the value of the product sold.

The history of the state's royalty in kind disposals to January 1, 1983 may be found in the department's Review of Alaska Royalty Oil of that date. The long term negotiated in kind royalty disposals to Chevron U.S.A., Inc. and Tesoro Alaska Petroleum Company of December 9, 1983, and to the Golden Valley Electric Association (GVEA) of February 8, 1985 were reviewed in the 1985 Historical and Projected Oil and Gas Consumption report (Supply/Demand study). The delivery of Alaska North Slope (ANS) royalty oil to Chevron and Tesoro began in May 1984 and October 1985, respectively.

GVEA began taking ANS royalty oil under its new contract in July 1985. The 1985 Supply/Demand study also addressed the termination of the Tesoro Cook Inlet royalty oil contract in October 1985, at which time the state began receiving Cook Inlet royalty oil in value. The 1985 Supply/Demand study also documented the competitive royalty oil sale of December 1984 and its attendent contingent backup disposals.

Two royalty in kind disposals in addition to the GVEA disposal occurred in 1985. These were the short term disposal of Kuparuk royalty oil and the long term disposal of Kuparuk royalty oil to Petro Star, Inc. and Chevron. The first disposal resulted from the department's April 1985 solicitation to sell 15,000 barrels per day (bpd) of Kuparuk royalty oil. That oil was awarded to U.S. Oil and Refining (8,000 bpd), Chevron (4,000 bpd), and Union Oil Company (3,000 bpd). The contract term of six months called for delivery of Kuparuk royalty oil upon the October 1, 1985 expiration of the six-month competitive contracts awarded during the 1984 competitive sale. The termination of the royalty oil contracts resulting from the April 1985 solicitation coincided with the April 1986 termination of all outstanding competitive royalty oil contracts.

On September 16, 1985 the department issued a document entitled Analysis and Recommendations for Disposition of State Royalty Oil (Analysis). The Analysis reviewed the state's December 1984 competitive sale and the solicitation of April 18, 1985, and evaluated negotiated royalty oil disposal options resulting from the department's Solicitation for Proposal(s) to Purchase Prudhoe Bay and/or Kuparuk River Unit Royalty Oil of April 1, 1985 (Solicitation).

Following her review of the staff analyses, the Commissioner of Natural Resources determined that the state's interests would be best served at that time by a negotiated long term sale to Petro Star, Inc. (Petro Star) and Chevron, and additional short term competitive sales. That policy was implemented through the department's Final Findings and Determination to Sell Kuparuk River Unit Royalty Oil to Petro Star, Inc. and Chevron U.S.A., Inc. of December 9, 1985 and the Final Findings and Determination to Conduct a Competitive Sale of Prudhoe Bay Royalty Oil of December 13, 1985.

On December 1, 1986, the department began selling approximately 6,500 barrels per day of Kuparuk River Unit royalty oil under the contract with Petro Star and Chevron. The first competitive sale resulting from the latter finding was held in February of 1986. Owing to the adverse market circumstances of the time, that sale drew no bidders. As a result, the department deferred additional competitive sales until there is some firm indication of demand resulting from improved market conditions.

Presently, North Slope royalty oil is taken both in value and in kind. Three in state refiners, Chevron, Tesoro Alaska Petroleum, and MAPCO Petroleum, Inc., hold long term negotiated contracts with the state for the purchase of Prudhoe Bay Unit royalty oil. Tables 2.2A and 2.2B depict estimated North Slope and Cook Inlet production to 2012 as well as the state's existing royalty oil contract obligations over that period. In addition to the three in-state refineries mentioned above, the department has long-term obligations to GVEA and Petro Star/Chevron under the contract terms of those disposals.

As mentioned earlier, the state began taking all Cook Inlet royalty oil in value on October 1, 1985. The department's decision to nominate Cook Inlet royalty oil for in value taking was based on the state's desire to have Cook Inlet royalty oil available for export. Following the federal administration's October 28, 1985 announcement of its intent to conditionally permit the export of Cook Inlet crude oil, the department issued the Cook Inlet Royalty Oil Export Sale Comment Document on November 25, 1985 (Comment Document).

The Comment Document outlined the department's tentative schedule and terms for a one-year sale of approximately 3,600 bpd of royalty oil produced from the west side of Cook Inlet. Following the U.S. Commerce Department's publication of the final regulations permitting export and a review of public comments received on the department's Comment Document, the department issued the Solicitation for Offers to Purchase West Side Cook Inlet Royalty Oil of July 15, 1986. That solicitation led to a tentative contract award to the Chinese Petroleum Corporation (Taiwan).

Following the close of a public comment period on January 5, 1987, the department expects to consummate that contract under which Chinese Petroleum Corporation would begin receiving Cook Inlet royalty oil in July of 1987.

This chapter discusses estimates of oil and gas reserves in the state and the state's royalty share of these reserves. The reserve estimates have been developed for low, mid and high cases. Terms of individual oil and gas lease contracts were used to calculate the state's royalty share of the respective reserves. The low estimates assume stable to falling oil and gas prices and/or less satisfactory than predicted reservoir performance. The high estimates assume rising oil and gas prices and/or better than currently expected reservoir performance. The mid case estimates assume relatively stable oil and gas prices and average reservoir performance.

The estimated reserves and royalty share for oil and gas are shown in Table 2.1. The estimates have been developed separately for Cook Inlet and the North Slope, as different sources of information were drawn upon for each category. In addition to listing reserves by area, this year's report also lists reserves as "proven and developed" or "proven but undeveloped or shut-in." These categories were used so that the reader can discern which volumes of oil and gas are readily marketable versus those where additional investment in facilities and transportation systems are needed and where there will be a corresponding time delay in bringing the reserves on line.

Cook Inlet

Considerable historical and subsurface information is available about the oil and gas reserves and potential in the Cook Inlet area, and major (i.e., large) new oil discoveries are not considered likely at this time. The reserves are assumed to remain constant for low, mid and high estimates. Cook Inlet reserves account for about 1.8% of the low, 1.3% of the mid, and 0.9% of the high estimates of statewide total oil and gas reserves.

North Slope

Oil and gas reserve estimates shown in Table 2.1 are for currently leased state lands.

Current North Slope oil production is from the Sadlerochit reservoir in the Prudhoe Bay Unit, the Kuparuk River reservoir in the Kuparuk River Unit and the Kuparuk River Formation in the Milne Point Unit (production from Milne Point Unit may be suspended in 1987). Full scale production from the Lisburne Reservoir in the Prudhoe Bay Unit is expected to commence in December 1986, and production from the Endicott field in the Duck Island Unit is expected to commence in late 1987 or early 1988. A pilot production program also is underway in the shallow Cretaceous sands in the Kuparuk River Unit. This pilot project is scheduled to cease operations on December 31, 1986. Additional enhanced oil recovery operations at Prudhoe Bay Unit, over and above what are already planned, recovery of gas condensate and natural gas liquids from the Sadlerochit and Lisburne gas caps and enhanced oil recovery from the Lisburne reservoir represent an oil resource (versus oil reserves) of about two billion additional barrels of liquids which may, or may not, be economically recoverable sometime in the future.The economics of enhanced oil recovery operations are extremely sensitive to capital costs and wellhead crude oil prices. Recovery of liquids from the Sadlerochit and Lisburne gas caps (and absent gas sales, simultaneous reinjection of the dry gas back into the reservoirs) would require some additional investment by the respective gas cap owners. However, installation at Prudhoe Bay in 1986 of a new large central gas facility designed to recover natural gas liquids (to be used for EOR purposes with the remainder being sold) from the produced gas stream represents a major step in establishing the infrastructure that will be needed to proceed with any future large scale gas sales or gas cycling projects. The possibility for conversion of any of the above mentioned resources to the proven reserves category and the timing of that conversion must be viewed with extreme caution at this time. However, because billions of barrels of oil will remain in the ground at Prudhoe Bay and Kuparuk River Units after completion of primary and secondary recovery operations, sufficient incentives to develop economic means of enhanced oil recovery will continue to exist well into the future.

Various leaseholders on the North Slope continue to experiment with techniques to economically produce the vast amounts of "heavy" oil held in the shallow Tertiary and Cretaceous age sands located primarily west of Prudhoe Bay. Technology and equipment already exist to produce these types of deposits in more temperate, less costly operating climates. However, permafrost considerations, surface-related construction and operating constraints, and the projected wellhead price of the produced oil to date have combined to stymie any commercial development of these relatively shallow (but very large) resources. Pilot production projects and laboratory research continue in an effort to improve project performance and economics.

Tables 2.2A and 2.2B list production forecasts for some of the fields listed in Table 2.1. Figure 2.1 graphically portrays these estimates. As illustrated, North Slope production is expected to increase slightly until 1987, then begin to decline in 1988.

Currently, no natural gas is exported from the North Slope. Both the Alaska Natural Gas Transportation System (ANGTS) and the Trans-Alaska Gasline System (TAGS) have been proposed as a means of moving North Slope gas to market. To date, neither project has secured financing or a guaranteed market. The continued volatility and uncertainty in prices for oil and gas, the relatively abundant supplies of natural gas currently available worldwide, and the sheer magnitude of the proposed projects combine to make the prospective purchasers of the gas, the financial institutions, and the projects' sponsors all very cautious at this time. Effects to secure markets for the gas are continuing. However, start up of the ANGTS or TAGS project cannot be expected until financing for the project is arranged, and financing likely will not be finalized until firm long-term markets for the gas are secured.

Several noteworthy oil and gas related events occurred in 1986. The five billionth barrel of oil was produced from the North Slope and transported through the Trans-Alaska Pipeline System and the two hundred fifthieth million barrel of oil was produced from the Kuparuk River Unit. In addition, one-half of the original in place oil reserves in the Sadlerochit Reservoir in the Prudhoe Bay Field have been produced in the first 9 1/2 years of field life. While efforts continue to increase ultimate recovery of oil at Prudhoe Bay, it is unrealistic to assume that any additional oil realized through new or expanded enhanced oil recovery techniques can replace or exceed annual withdrawals (500 million plus barrels per year) from that reservoir.

The current production rate at Prudhoe Bay ultimately has to begin to decline. The current 1.5 million barrel-per-day production rate at Prudhoe Bay is expected to begin to decline in late 1987 or early 1988. The actual timing of the decline will be influenced by the level of infill development drilling, scheduling of well workovers, water and rich gas injection rates, and the capabilities of unit gas handling facilities.

It is possible that the current production rate could be maintained through 1988 and even 1989, given a specific set of reservoir management decisions are adopted by the operators and that the reservoir then performs as expected. The production forecast presented in this report assumes that the production rate at Prudhoe Bay will begin to decline in early 1988.

Undiscovered Resources

Estimates of undiscovered oil and gas resources in Alaska are discussed here for the reader's information and benefit only and have not been used in the forecasts developed in this report. The United States Minerals Management Service (MMS) estimates the quantities of conventionally producible reserves based upon both public and confidential information to which it has access. At the 95% confidence level, the mean MMS estimates of undiscovered resources in Alaska are 3.3 billion barrels of oil and 13.8 trillion cubic feet of gas.[1] National Petroleum Council (NPC) resource estimates require yields on investment of greater than 10% for oil and gas and 15% for oil alone before a field is considered "commercial." With these thresholds in mind, NPC estimates that 17.8 billion barrels of undiscovered oil and 10.1 trillion cubic feet of undiscovered gas could be produced commercially in Alaska.[2] A majority of the oil and gas resources identified by the MMS and the NPC are likely to be found on federal and private lands. The reader should also refer to the U.S. Department of the Interior's report entitled Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment for estimates of oil and gas resources in the Arctic National Wildlife Refuge.

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1 Minerals Management Service, "Estimates of Undiscovered, Economically Recoverable Oil and Gas Resources for the Outer Continental Shelf as of July 1984," OCS Report, MMS 85-0012, 1985.

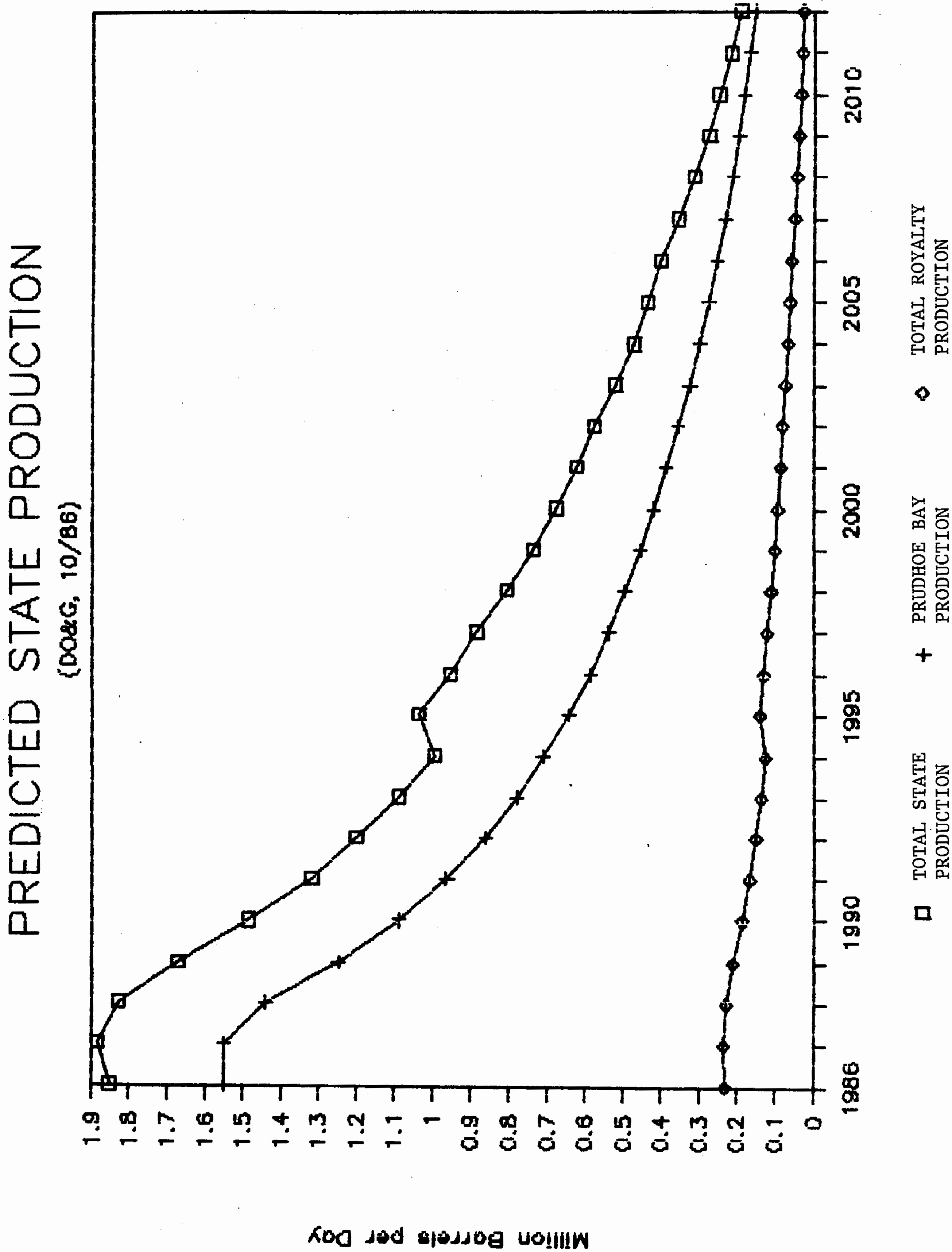
2 "'NPC' Sees Big US-Arctic Resources," Oil and Gas Journal, November 23, 1981.

ESTIMATED REMAINING RECOVERABLE RESERVES AND ROYALTY SHARE TABLE 2.1

	OIL (Millions of Barrels)						GAS (Billion Cubic Feet)					
	Recoverable Reserves			Royalty Share			Recoverable Reserves			Royalty Share		
	LOW	MID	HIGH	LOW	MID	HIGH	LOW	MID	HIGH	LOW	MID	HIGH
COOK INLET [1]												
Proven and Developed												
Beaver Creek	1	1	1	0	0	0	210	210	210	0	0	0
Beluga River	--	--	--	--	--	--	774	774	774 [2]	58	58	58
Birch Hill	--	--	--	--	--	--	11	11	11	0	0	0
Cannery Loop	--	--	--	--	--	--	300	300	300 [2]	12	12	12
Granite Point	22	22	22	3	3	3	15	15	15	2	2	2
Ivan River, Lewis River, Pretty Creek and Stump Lake	--	--	--	--	--	--	500	500	500 [2]	63	63	63
Kenai	--	--	--	--	--	--	756	756	756 [2]	16	16	16
McArthur River	51	51	51	6	6	6	650	650	650 [2][3]	81	81	81
Middle Ground Shoal	12	12	12	2	2	2	8	8	8	1	1	1
North Cook Inlet	--	--	--	--	--	--	817	817	817 [2]	102	102	102
Sterling	--	--	--	--	--	--	23	23	23	<1	<1	<1
Swanson River	12	12	12	0	0	0	259	259	259	0	0	0
Trading Bay	2	2	2	<1	<1	<1	[3]	[3]	[3]	[3]	[3]	[3]
Proven but Undeveloped or Shut In												
Falls Creek	--	--	--	--	--	--	13	13	13	2	2	2
Nicolai Creek	--	--	--	--	--	--	3	3	3	<1	<1	<1
North Fork	--	--	--	--	--	--	12	12	12	<1	<1	<1
West Foreland	--	--	--	--	--	--	20	20	20	0	0	0
West Fork	--	--	--	--	--	--	6	6	6	<1	<1	<1
SUBTOTAL	100	100	100	11	11	11	4,377	4,377	4,377	336	336	336
NORTH SLOPE [2]												
Proven and Developed												
Endicott	275	375	450	39	53	63	600	800	1,200	84	112	168
Kuparuk River Unit	730	1,050	1,230	91	131	154	450	600	750	56	75	94
Lisburne reservoir	300	400	600	38	50	75	800	900	1,000	100	113	125
Milne Point Area	1	16	96	0	3	17	--	--	--	--	--	--
Prudhoe Bay Unit	4,431	5,486	6,581	554	686	823	29,000	29,000	29,000	3,625	3,625	3,625
Proven but Undeveloped or Shut In												
Beaufort Sea	0	0	300	0	0	60	--	--	--	--	--	--
Gwydyr Bay Area	0	0	10	0	0	1	--	--	--	--	--	--
Point Thomson Area and Flaxman Island Area [4]	0	0	350	0	0	44	0	0	5,000	0	0	625
Shallow Cretaceous Sands	0	0	3,000	0	0	375	--	--	--	--	--	--
SUBTOTAL	5,737	7,327	12,617	721	922	1,612	30,850	31,300	36,950	3,865	3,925	4,637
STATE TOTAL	5,837	7,427	12,717	732	933	1,622	35,227	35,677	41,327	4,201	4,261	4,973

[1] As of 1/86, except where noted as [2]. Alaska Oil and Gas Conservation Commission, "Estimate of Oil Reserves in Alaska" and "Estimate of Gas Reserves in Alaska."
[2] As of 10/86. Estimates by Van Dyke, W..
[3] McArthur River gas reserves include Trading Bay gas reserves.
[4] Oil and gas condensate.
S/D87;T2_1;10/27/86

FIGURE 2.1


PREDICTED STATE PRODUCTION
(DO&G, 10/86)
Million Barrels per Day
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1986
1990
1995
2000
2005
2010
TOTAL STATE PRODUCTION
PRUDHOE BAY PRODUCTION
TOTAL ROYALTY PRODUCTION

PRODUCTION FORCAST AND AVAILABLE ROYALTY OIL (Thousand Barrels/Day) TABLE 2.2A

YEAR:	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	SUM (Mbbl)
PRODUCTION FORCAST																												
North Slope																												
Prudhoe Bay	1,550	1,550	1,441	1,247	1,090	965	862	780	710	643	585	538	495	455	419	385	355	326	300	276	254	234	215	198	182	167	153	5,976,875
Kuparuk	240	240	240	220	187	159	135	122	109	98	89	80	72	65	58	52	47	42	38	34	31	28	25	20	15	10	0	896,440
Lisburne	0	50	60	70	80	90	100	100	100	90	80	72	65	58	52	47	42	38	34	31	28	25	20	15	10	0	0	495,305
Endicott	0	0	50	100	100	100	100	85	75	70	65	60	55	50	45	40	20	10	0	0	0	0	0	0	0	0	0	374,125
Milne Point	19	9	7	6	5	4	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20,951
Other	0	0	0	0	0	0	0	0	0	135	135	135	120	108	103	98	112	105	100	95	88	67	56	44	42	40	38	591,665
Cook Inlet																												
Granite Point	7.288	6.560	5.904	5.312	4.784																							10,895
McArthur River	22.872	19.048	15.888	13.272	11.104																							29,997
Trading Bay	1.864	1.464	1.184	0.984	0.832																							2,310
Middle Ground Shoal	7.184	6.216	5.376	4.656	4.032																							10,024
NGL	3.360	3.360	3.360	3.360	3.360																							6,132
SUBTOTAL-NORTH SLOPE	1,809	1,849	1,798	1,643	1,462	1,318	1,201	1,090	994	1,036	954	885	807	736	677	622	576	521	472	436	401	354	316	277	249	217	191	8,355,361
SUBTOTAL-COOK INLET	42.568	36.648	31.712	27.584	24.112																							59,358
TOTAL	1,852	1,885	1,830	1,671	1,486	1,318	1,201	1,090	994	1,036	954	885	807	736	677	622	576	521	472	436	401	354	316	277	249	217	191	8,414,719
AVAILABLE ROYALTY OIL																												
North Slope																												
Prudhoe Bay [1]	194	194	180	156	136	121	108	98	89	80	73	67	62	57	52	48	44	41	38	35	32	29	27	25	23	21	19	747,109
Kuparuk [1]	30	30	30	28	23	20	17	15	14	12	11	10	9	8	7	7	6	5	5	4	4	4	3	3	2	1	0	112,055
Lisburne [1]	0	6	8	9	10	11	13	13	13	11	10	9	8	7	7	6	5	5	4	4	4	3	3	2	1	0	0	61,913
Endicott [2]	0	0	7	14	14	14	14	12	11	10	9	8	8	7	6	6	3	1	0	0	0	0	0	0	0	0	0	52,378
Milne Point [3]	3	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,771
Other [4]	0	0	0	0	0	0	0	0	0	27	27	27	24	22	21	20	22	21	20	19	18	13	11	9	8	8	8	118,333
Cook Inlet																												
Granite Point	0.311	0.820	0.738	0.664	0.598																							1,362
McArthur River	2.859	2.381	1.986	1.659	1.388																							3,750
Trading Bay	0.233	0.183	0.148	0.123	0.104																							289
Middle Ground Shoal	0.898	0.777	0.672	0.582	0.504																							1,253
NGL	0.420	0.420	0.420	0.420	0.420																							767
SUBTOTAL-NORTH SLOPE	227	232	226	207	185	167	152	138	125	141	130	122	111	101	93	86	81	73	67	62	57	49	44	38	34	30	27	1,095,559
SUBTOTAL-COOK INLET	5.321	4.581	3.964	3.448	3.014																							7,420
TOTAL	232	236	230	211	188	167	152	138	125	141	130	122	111	101	93	86	81	73	67	62	57	49	44	38	34	30	27	1,102,979
ROYALTY OIL SALES (In-Kind)																												
Mapco	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35										229,950
GVEA [5]	5	5	5	4	4	3	3	3	2																			12,405
Tesoro (Old) [6]	48	48	44	38	33	30	26	24	22																			114,114
(New) [7]	27																											9,802
Chevron [8]	19	19	17	15	13	12	10	9	9																			44,654
Petrostar [9]	6	7	7	7	6	5	4	3	3	3																		18,615
Cook Inlet (Proposed)		4	4																									
TOTAL	139	117	112	99	91	84	79	74	71	38	35	35	35	35	35	35	35	35										432,169
ROYALTY OIL IN VALUE	93	119	118	111	96	82	73	64	55	103	95	87	76	66	58	51	46	38	67	62	57	49	44	38	34	30	27	670,810

Note: numbers may not sum to totals due to rounding errors.

[1] 12.5% of production.
[2] 14.0% of production (weighted average).
[3] 18.0% of production (weighted average).
[4] 20.0% of production.
[5] 2.667% of Prudhoe Bay production.
[6] 24.533% of Prudhoe Bay production.
[7] 13.86% of Prudhoe Bay production.
[8] 9.6% of Prudhoe Bay production.
[9] The Petro Star/Chevron contract is for 20.31% of Kuparuk River Unit royalty oil production. Petro Star/Chevron initially would purchase 6,000 BPD. The contract will expire September 30, 1996.

S/D87;T2_2;10/24/86

ESTIMATED PRODUCTION AND SALES OF NORTH SLOPE ROYALTY OIL [1]
(THOUSAND BARRELS PER DAY)

TABLE 2.2B

YEAR	ESTIMATED TOTAL PRODUCTION [2]						ESTIMATED ROYALTY PRODUCTION						ESTIMATED SALES OF ROYALTY OIL							ROYALTY IN VALUE
	PRUDHOE	KUPARUK	LISBURNE	ENDICOTT	MILNE PT.	TOTAL	PRUDHOE	KUPARUK	LISBURNE	ENDICOTT	MILNE PT.	TOTAL	MAPCO	GVEA [3]	TESORO (OLD) [4]	TESORO (NEW) [5]	CHEVRON [6]	PETROSTAR [7]	COOK INLET (PROPOSED)	
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1986	1,550	240	—	—	19	1.809	194	30	—	—	3	227	35	5	48	27	19	6	—	88
1987	1,550	240	50	—	9	1.849	194	30	6	—	2	232	35	5	48	—	19	7	4	114
1988	1,441	240	60	50	7	1,798	180	30	8	7	1	226	35	5	44	—	17	7	4	114
1989	1,247	220	70	100	6	1,643	156	28	9	14	1	207	35	4	38	—	15	6	—	108
1990	1,090	187	80	100	5	1,462	136	23	10	14	1	185	35	4	33	—	13	6	—	94
1991	965	159	90	100	4	1,318	121	20	11	14	1	166	35	3	30	—	12	5	—	82
1992	862	135	100	100	4	1,201	108	17	13	14	1	152	35	3	26	—	10	4	—	73
1993	780	122	100	85	3	1,090	98	15	13	12	1	138	35	3	24	—	9	4	—	63
1994	710	109	100	75	—	994	89	14	13	11	—	125	35	2	22	—	9	3	—	54
1995	643	98	90	70	—	901	80	12	11	10	—	114	35	—	—	—	—	3	—	76
1996	585	89	80	65	—	819	73	11	10	9	—	103	35	—	—	—	—	3	—	66
1997	538	80	72	60	—	750	67	10	9	8	—	95	35	—	—	—	—	—	—	60
1998	495	72	65	55	—	687	62	9	8	8	—	87	35	—	—	—	—	—	—	52
1999	455	65	58	50	—	628	57	8	7	7	—	79	35	—	—	—	—	—	—	44
2000	419	56	52	45	—	574	52	7	7	6	—	72	35	—	—	—	—	—	—	37
2001	385	52	47	40	—	524	48	7	6	6	—	66	35	—	—	—	—	—	—	31
2002	355	47	42	20	—	464	44	6	5	3	—	58	35	—	—	—	—	—	—	23
2003	326	42	38	10	—	416	41	5	5	1	—	52	35	—	—	—	—	—	—	17
2004	300	38	34	—	—	372	38	5	4	—	—	47	—	—	—	—	—	—	—	47
2005	276	34	31	—	—	341	35	4	4	—	—	43	—	—	—	—	—	—	—	43
2006	254	31	28	—	—	313	32	4	4	—	—	39	—	—	—	—	—	—	—	39
2007	234	28	25	—	—	287	29	4	3	—	—	36	—	—	—	—	—	—	—	36
2008	215	25	20	—	—	260	27	3	3	—	—	33	—	—	—	—	—	—	—	33
2009	198	20	15	—	—	233	25	3	2	—	—	29	—	—	—	—	—	—	—	29
2010	182	15	10	—	—	207	23	2	1	—	—	26	—	—	—	—	—	—	—	26
2011	167	10	—	—	—	177	21	1	—	—	—	22	—	—	—	—	—	—	—	22
2012	153	—	—	—	—	153	19	—	—	—	—	19	—	—	—	—	—	—	—	19

[1] INCLUDES ONLY FIELDS IN, OR PLANNED FOR, PRODUCTION IN THE YEAR FUTURE.
[2] DNR ESTIMATE OF FIELD PERFORMANCE, OCTOBER, 1986.
[3] GVEA'S TEN-YEAR CONTRACT COMMENCED JULY 1, 1985. QUANTITY IS 2.667% OF DAILY PRUDHOE ROYALTY OIL.
[4] TESORO'S CONTRACT IS CURRENTLY AT ITS MAXIMUM QUANTITY OF 24.533% OF DAILY PRUDHOE ROYALTY OIL. THE CONTRACT EXPIRES JANUARY 1995.
[5] ON OCTOBER 1,1985 TESORO COMMENCED DELIVERIES UNDER 12/9/83 PRUDHOE CONTRACT WHICH HAS A MAXIMUM QUANTITY OF 13.86% OF DAILY PRUDHOE ROYALTY OIL AND EXPIRES JANUARY 1, 1995. TESORO DENOMINATED THE ENTIRE VOLUME UNDER THIS CONTRACT EFFECTIVE AUGUST 20, 1986, BUT HAS THE OPTION OF RENOMINATING ON SIX MONTHS NOTICE.
[6] CHEVRON'S CONTRACT CALLS FOR A MAXIMUM QUANTITY OF 9.6% OF DAILY PRUDHOE ROYALTY OIL. THE CONTRACT EXPIRES JANUARY 1, 1995.
[7] THE PETROSTAR/CHEVRON CONTRACT IS FOR 20.31% OF KUPARUK RIVER UNIT ROYALTY OIL PRODUCTION. PETROSTAR/CHEVRON INITIALLY WOULD PURCHASE 6,000 BPD. THE CONTRACT WILL EXPIRE SEPTEMBER 30, 1996.

S/DB7;T2_2B;11/25/86

Oil Production

All Alaska oil has been produced from two areas, Cook Inlet and the North Slope, aside from a minor amount produced at Katalla before 1933. Since starting production in the 1960's Cook Inlet fields have produced a total of 1.1 billion barrels of oil, including an estimated 23 million barrels in 1986. North Slope fields have produced a cumulative 5.2 billion barrels, of which about 663 million barrels were produced in 1986. State production data between 1977 and 1986 are shown in Table 3.1 and Figure 3.1. Additional information on individual fields are included in Appendix A.1, A.2, and A.3.

Oil Consumption

There are few data sources which indicate exactly how much petroleum is consumed in Alaska. Though most petroleum is consumed as refined fuels, some of it being refined in state and the rest imported, there are no accurate and timely reports on the volumes involved. However, since 1977 the Department of Revenue (DOR) has collected data from fuel distributers on volumes of fuels sold in several catagories and has published monthly abstracts of this data. Through the years, aviation fuel catagories are probably the most reliable in indicating the quantity consumed and end use. In the early reporting years data for other fuel classes are less reliable both in reported volumes and end use because the completeness of the reports could not be determined and because several end uses apparently shifted from catagory to catagory as tax reporting requirements shifted. Recent data are believed to be of much better quality. DOR reports indicate that between 1977 and 1987 total fuel consumption grew 8.7% yearly to an estimated 1.6 billion gallons in 1986. Table 3.2 and Figure 3.2 show yearly summaries of DOR data between 1977 and 1986.

Gas Production

Natural gas is produced from Cook Inlet fields and the North Slope, the same areas which currently produce all of Alaska's oil. Cook Inlet fields began production in the mid 1960s and by the end of 1986 had produced about 3.1 trillion cubic feet, net of injection, with 192 billion cubic feet of that total in 1986. Production from the North Slope region began in the mid 1970s, and since then operations there have produced 802 billion cubic feet, net of injection, including 118 billion cubic feet of gas in 1986. Production data for the state and regions are given in Table 3.3 and Figure 3.3.

Gas Consumption

Consumption patterns of the Cook Inlet and North Slope regions are quite different. In 1986, Cook Inlet fields used 21 billion cubic feet for field operations, but the region's major feature is its pipeline connections to a market which this past year consumed 171 billion cubic feet, which is 89% of net production (net production being gas available after field operations and losses). The major consumers were: LNG, 30% of net production; electrical generation, 20%; ammonia/urea, 17%; and gas utilities, 14%.

The North Slope region, however, produces a very large amount of gas in association with the oil production, but has no market for the gas other than operating the oil production facilities. Most of the North Slope's net gas production, 98 billion cubic feet in 1986, is consumed in field operations and the remainder, 21 billion cubic feet, is sold, primarily to the Trans-Alaska Pipeline System (TAPS). Table 3.4 and Figures 3.4 and 3.5 show state and regional gas consumption data from 1971 to 1986.

HISTORICAL OIL PRODUCTION — TABLE 3.1

YEAR:	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986 [1]
PRODUCTION [2] (Million Barrels/Year)										
Gross State Production	171.318	447.810	511.335	591.640	587.339	618.910	625.527	630.408	666.243	684.808
Item:										
TAPS Throughput, PS #1	112.315	397.149	467.939	554.934	556.067	591.142	600.859	608.836	649.887	668.520
Item:										
Liftings at Valdez	96.669	394.080	464.394	548.895	547.026	583.370	592.319	596.588	643.616	654.194

[1] Estimated from part-yearly reports.
[2] Alaska Oil and Gas Conservation Commission, "Statistical Report," 1977-1985 and Alyeska Pipeline Service Co., personal communication.
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HISTORICAL OIL CONSUMPTION - SALES AND SHIPMENTS — TABLE 3.2

YEAR:	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986 [1]
FUEL SALES [3] (Million Gallons/Year)										
Aviation Gas	16.770	15.830	16.925	16.912	18.754	16.596	15.244	17.399	17.997	17.955
Exempt	1.521	0.685	0.552	0.558	0.574	0.589	0.498	0.574	0.515	0.889
Taxable	15.249	15.145	16.373	16.354	18.180	16.007	14.746	16.825	17.482	17.066
Aviation Jet	330.744	363.607	415.164	416.184	400.177	432.366	517.575	611.314	518.092	555.079
Exempt	227.581	250.601	288.974	286.110	247.619	99.957	242.815	311.820	223.635	256.052
Taxable	103.163	113.006	126.190	130.074	152.558	332.409	274.760	299.494	294.457	299.027
Marine Gas	11.766	7.714	8.296	7.598	7.602	7.878	8.568	8.955	14.664	10.006
Exempt	5.707	0.554	0.292	0.025	0.085	0.032	0.052	0.120	0.251	0.278
Taxable	6.059	7.160	8.004	7.573	7.517	7.846	8.516	8.835	14.413	9.728
Marine Diesel	38.613	51.985	59.492	67.711	72.282	99.443	147.569	124.416	98.675	103.474
Exempt	6.396	10.116	6.325	5.370	5.153	30.443	75.395	50.874	9.724	6.367
Taxable	32.217	41.869	53.167	62.341	67.129	69.000	72.174	73.542	88.951	97.107
Other Gas	186.213	187.359	181.329	177.353	186.446	210.644	197.968	223.178	235.081	234.711
Exempt	5.094	8.290	7.527	8.162	9.084	12.809	10.887	11.028	15.353	20.164
Taxable	181.119	179.069	173.802	169.191	177.362	197.835	187.081	212.150	219.728	214.547
Other Diesel	165.752	184.876	269.377	302.647	326.440	411.125	420.279	436.308	643.430	667.272
Exempt	46.160	54.050	120.960	120.939	117.074	187.856	178.494	190.891	369.279	393.659
Taxable	119.592	130.826	148.417	181.708	209.366	223.269	241.785	245.113	274.151	273.613
TOTAL FUEL SALES	749.858	811.371	950.583	988.405	1,011.701	1,178.052	1,307.203	1,421.570	1,527.939	1,588.497
SHIPMENTS [2] (MMbbl/Year)										
Liftings at Valdez	96.669	394.080	464.394	548.895	547.026	583.370	592.319	596.588	643.512	

[1] Estimated from part-yearly reports.
[2] Alaska Oil and Gas Conservation Commission, "Statistical Report," 1977-1985 and Alyeska Pipeline Service Co., personal communication.
[3] Alaska Department of Revenue, "Report of Motor Fuel Sold or Distributed in Alaska."
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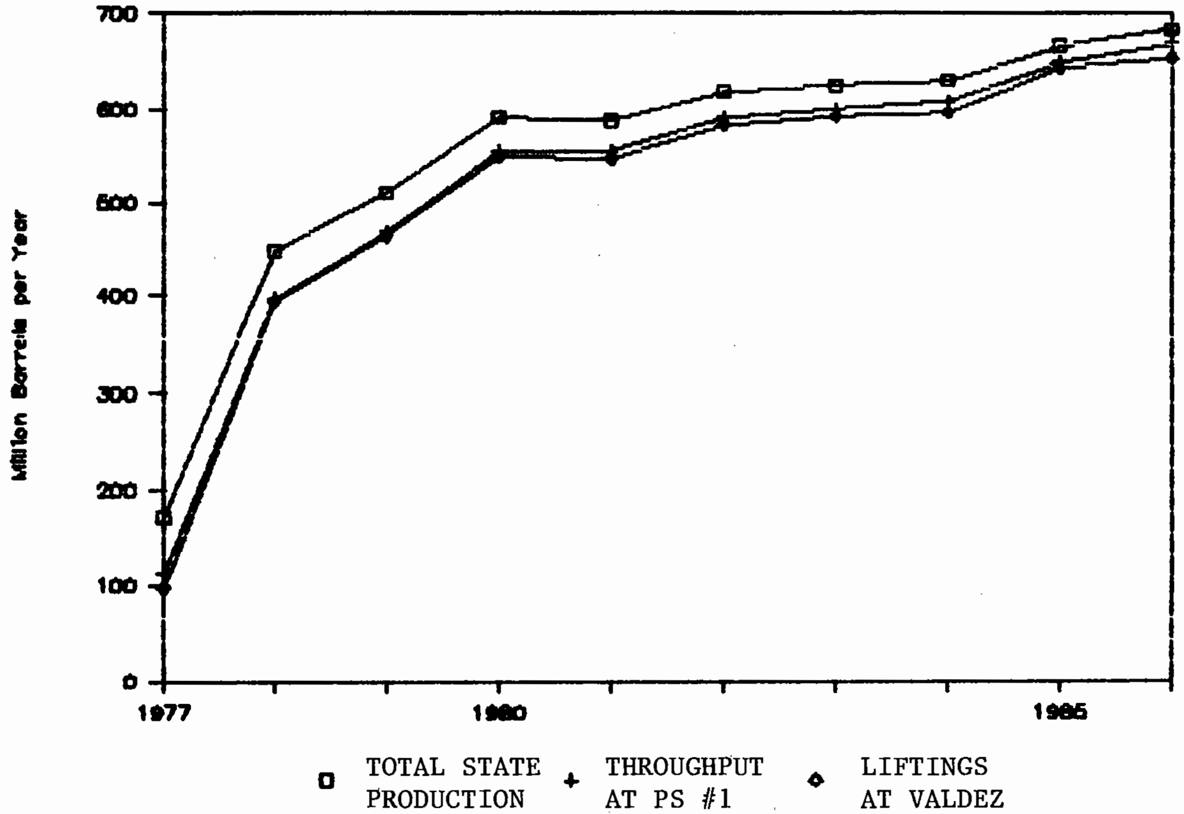
HISTORICAL OIL PRODUCTION

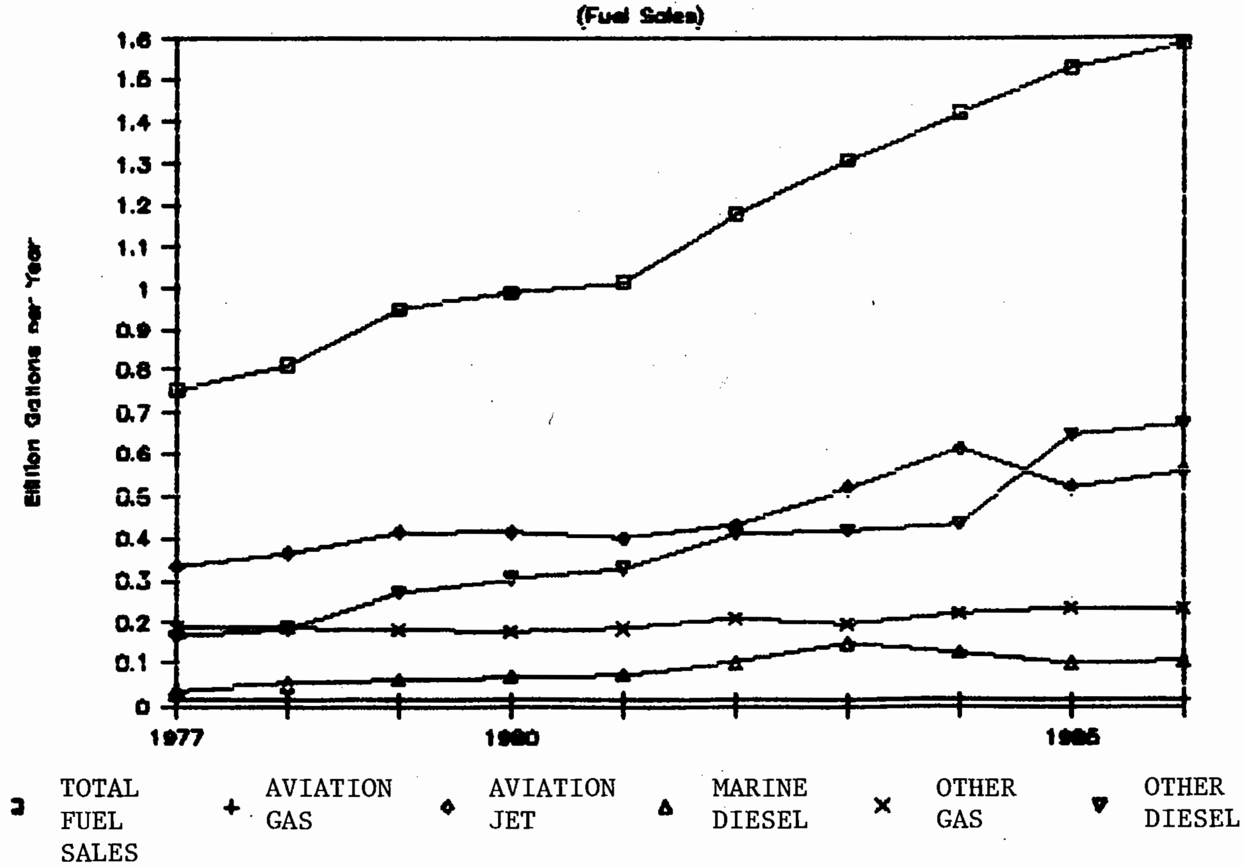
Figure 3.1



HISTORICAL OIL CONSUMPTION

Figure 3.2

(Fuel Sales)



HISTORICAL GAS PRODUCTION (Billion Cubic Feet/Year)

TABLE 3.3

YEAR:	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986 [1]
STATE [2]																
Production	227.94	222.79	225.24	232.97	256.399	271.162	375.832	602.687	738.485	898.155	948.554	1,090.655	1,171.121	1,212.705	1,350.884	1,398.881
Injection [3]	73.88	76.13	87.78	49.04	83.007	97.077	171.188	375.405	503.003	661.947	695.515	817.863	886.364	909.617	1,021.459	1,087.728
Net Production	154.06	146.66	137.46	183.93	173.392	174.085	204.644	227.282	235.482	236.208	253.039	272.792	284.757	303.088	329.425	311.153
RAILBELT (Cook Inlet) [2]																
Production	227.94	222.79	225.24	230.18	252.554	265.253	279.961	293.800	305.075	299.942	299.051	309.119	306.343	306.956	306.937	278.094
Injection [3]	73.88	76.13	87.78	49.04	83.007	97.077	103.108	103.551	112.868	115.437	100.410	102.248	94.385	93.687	89.025	94.865
Net Production	154.06	146.66	137.46	181.14	169.547	168.176	176.853	190.249	192.207	184.505	198.641	206.871	211.958	213.269	217.912	183.229
NON-RAILBELT (North Slope)																
Production	---	---	---	2.79	3.845	5.909	95.871	308.887	433.410	598.214	649.504	781.536	864.778	905.749	1,043.911	1,111.787
Injection	---	---	---	0.00	0.000	0.000	68.080	271.854	390.136	546.509	595.106	715.615	791.979	815.929	932.434	992.862
Net Production	---	---	---	2.79	3.845	5.909	27.791	37.033	43.274	51.705	54.398	65.921	72.799	89.820	111.477	118.925

[1] Estimated from part-yearly reports of cited sources.
[2] 1971-73: Stanford Research Institute, "Natural Gas Demand and Supply to the Year 2000 in the Cook Inlet Basin of South Central Alaska," Nov. 1977.
1974-85: Alaska Oil and Gas Conservation Commission, "Report of Gas Disposition," monthly reports.
[3] Does not include gas rented from Beaver Creek and Kenai fields for injection into Swanson River field.
S/D87;T3_3_4;9/24/86

HISTORICAL GAS CONSUMPTION (Billion Cubic Feet/Year)

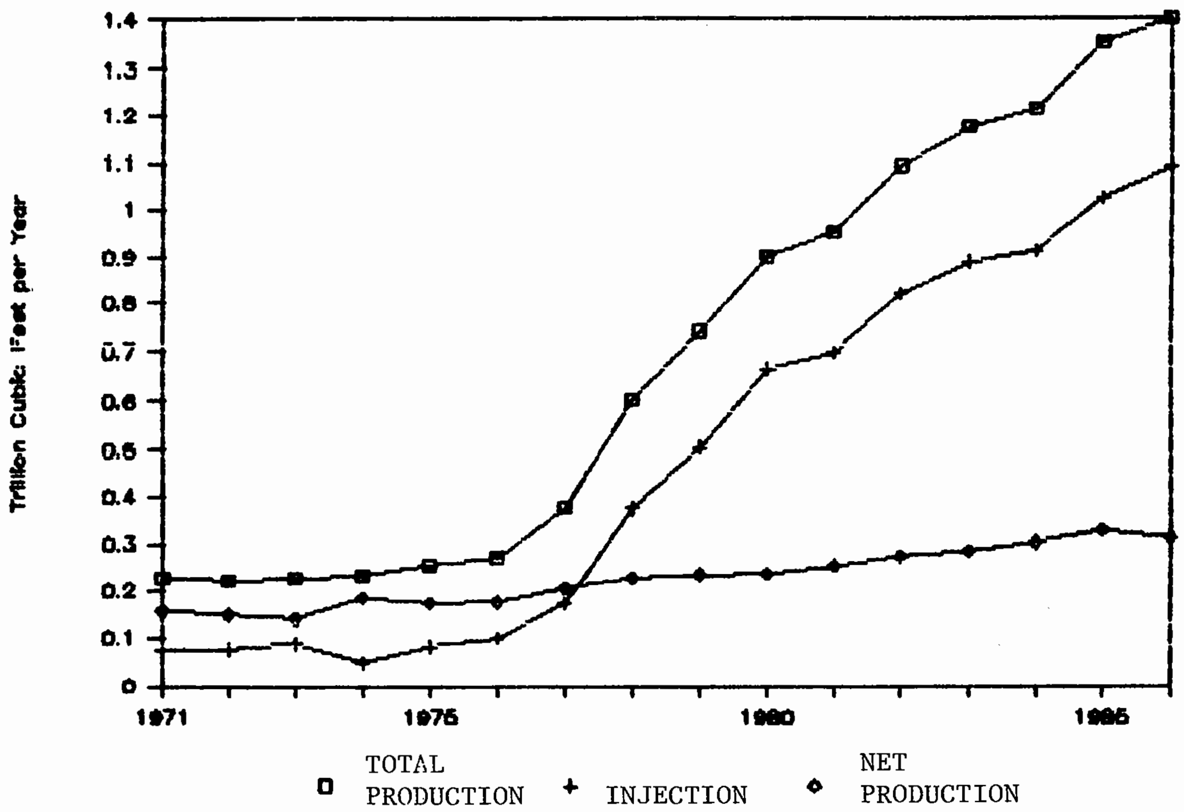
TABLE 3.4

YEAR:	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986 [1]
STATE [2]																
Field Operations	45.25	36.56	20.90	52.48	31.639	28.322	48.859	55.180	57.865	62.001	62.166	72.876	77.590	95.249	110.025	118.706
Vented and Flared	33.18	20.98	6.93	9.05	10.557	6.674	15.729	6.183	4.551	4.846	5.660	6.983	5.084	9.075	6.330	6.718
Used on Leases	10.96	14.86	12.42	41.40	17.963	18.424	29.966	35.055	38.123	43.575	44.592	52.724	58.893	68.481	84.654	92.209
Shrinkage	1.11	0.72	1.55	2.01	3.119	3.224	3.145	3.426	2.847	2.438	2.434	2.602	2.726	2.657	1.773	2.236
Other	0.00	0.00	0.00	0.02	0.000	0.000	0.019	10.516	12.344	11.142	9.480	10.567	10.887	15.036	17.268	17.543
Sold [3]	121.72	123.72	130.94	130.65	141.754	145.763	155.785	172.101	177.616	174.208	190.873	199.914	207.167	207.840	219.400	192.447
Power generation	14.69	15.38	16.70	17.45	25.461	27.613	28.590	29.937	33.376	33.755	33.947	36.222	36.651	37.000	41.337	44.038
Public [4][5]	8.14	8.91	10.63	11.76	19.619	22.189	23.590	24.811	28.390	28.992	29.386	31.392	32.055	32.662	36.807	39.598
Military [4]	6.55	6.47	6.07	5.68	5.842	5.424	5.000	5.126	4.986	4.763	4.561	4.830	4.596	4.338	4.530	4.440
Gas Utilities	10.24	13.10	14.76	15.13	12.092	12.551	12.683	13.745	14.362	15.921	16.213	19.564	19.518	20.911	24.872	26.245
Residential [4][5]	5.44	6.03	6.52	6.72	5.548	5.916	6.010	6.827	7.228	8.173	8.385	10.520	10.609	11.507	12.898	13.626
Commercial [4]	4.80	7.07	8.24	8.41	6.544	6.635	6.673	6.918	7.134	7.748	7.828	9.044	8.909	9.404	11.974	12.619
LNG [6]	63.24	59.87	60.99	61.87	64.777	63.509	66.912	60.874	64.111	54.844	68.823	64.438	67.729	65.892	65.177	56.782
Amonia-Urea [7]	19.49	20.58	20.64	22.10	23.888	24.257	28.620	48.879	51.657	54.699	53.836	55.220	50.338	50.083	50.688	32.388
Producers [8]	---	13.40	12.59	10.41	12.477	11.588	6.703	10.523	6.958	5.190	5.601	11.383	12.698	18.362	21.532	18.620
Refiners [9]	---	0.56	1.94	2.47	3.268	1.785	0.199	0.237	0.285	0.380	0.316	0.486	0.502	0.938	1.306	1.208
TAPS [10]	0.00	0.00	0.00	0.00	0.000	0.000	1.754	6.949	8.648	10.686	11.106	11.952	13.277	12.856	14.381	14.754
Unaccounted for [11]	14.06	0.83	3.32	0.89	(0.209)	4.460	10.324	1.467	(1.229)	(0.632)	1.031	0.649	6.454	1.798	0.107	(1.589)
RAILBELT																
Field Operations	45.25	36.56	20.90	49.83	28.830	24.467	24.416	25.949	24.101	22.304	20.559	20.957	19.380	22.468	18.637	20.803
Vented and Flared	33.18	20.98	6.93	7.98	9.496	5.421	4.848	3.870	2.710	3.045	3.175	3.494	2.560	3.260	2.893	3.455
Used on Leases	10.96	14.86	12.42	39.85	16.215	15.822	16.404	16.228	14.564	14.608	14.950	14.861	14.056	14.597	13.971	15.112
Shrinkage	1.11	0.72	1.55	2.01	3.119	3.224	3.145	3.426	2.847	2.438	2.434	2.602	2.726	2.657	1.773	2.236
Other	0.00	0.00	0.00	0.00	0.000	0.000	0.019	2.425	3.980	2.213	0.000	0.000	0.038	1.954	0.000	0.000
Sold [3]	121.72	123.72	130.94	130.51	140.717	143.710	152.437	164.300	168.106	162.201	178.082	185.913	192.578	192.752	199.311	171.426
Power generation	14.69	15.38	16.70	17.45	25.461	27.613	28.590	29.718	33.141	33.520	33.632	35.818	36.169	36.520	40.851	43.481
Public [4]	8.14	8.91	10.63	11.76	19.619	22.189	23.590	24.592	28.155	28.757	29.071	30.988	31.573	32.182	36.321	39.041
Military [4]	6.55	6.47	6.07	5.68	5.842	5.424	5.000	5.126	4.986	4.763	4.561	4.830	4.596	4.338	4.530	4.440
Gas Utilities	10.24	13.10	14.76	15.13	12.092	12.551	12.683	13.454	14.045	15.521	15.778	19.025	19.111	20.903	24.419	25.858
Residential [4]	5.44	6.03	6.52	6.72	5.548	5.916	6.010	6.536	6.911	7.773	7.950	9.981	10.202	10.999	12.445	13.239
Commercial [4]	4.80	7.07	8.24	8.41	6.544	6.635	6.673	6.918	7.134	7.748	7.828	9.044	8.909	9.904	11.974	12.619
LNG [6]	63.24	59.87	60.99	61.87	64.777	63.509	66.912	60.874	64.111	54.844	68.823	64.438	67.729	65.882	65.177	56.782
Amonia-Urea [7]	19.49	20.58	20.64	22.10	23.888	24.257	28.620	48.879	51.657	54.699	53.836	55.220	50.338	50.083	50.688	32.388
Producers [8]	---	13.40	12.59	10.41	12.477	11.588	6.703	10.523	6.958	5.190	5.601	11.383	12.698	18.362	21.532	18.620
Unaccounted for [11]	14.06	1.39	5.26	3.36	2.022	4.192	8.929	0.852	(1.806)	(1.573)	0.412	0.029	6.533	1.002	(3.356)	(5.703)
NON-RAILBELT																
Field Operations [3]	---	---	---	2.65	2.808	3.856	24.444	29.231	33.763	39.697	41.607	51.921	58.210	74.732	91.388	97.903
Vented and Flared	---	---	---	1.08	1.061	1.254	10.882	2.313	1.840	1.801	2.485	3.490	2.524	5.814	3.437	3.263
Used on Leases	---	---	---	1.56	1.747	2.602	13.562	18.826	23.559	28.967	29.642	37.864	44.837	53.884	70.683	77.097
Shrinkage	---	---	---	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other	---	---	---	0.02	0.000	0.000	0.000	8.092	8.364	8.929	9.480	10.567	10.849	15.034	17.268	17.543
Sold [3]	---	---	---	0.14	1.037	2.054	3.347	7.802	9.512	12.007	12.791	14.000	14.589	15.088	20.089	21.021
Power generation [5]	---	---	---	---	---	---	---	0.219	0.235	0.235	0.315	0.404	0.482	0.480	0.486	0.557
Gas Utilities [5]	---	---	---	---	---	---	---	0.291	0.317	0.400	0.435	0.539	0.407	0.508	0.453	0.387
Refiners [9]	---	0.56	1.94	2.47	3.268	1.785	0.199	0.237	0.285	0.380	0.316	0.486	0.502	0.938	1.306	1.208
TAPS [10]	0.00	0.00	0.00	0.00	0.000	0.000	1.754	6.949	8.648	10.686	11.106	11.952	13.277	12.856	14.381	14.754
Unaccounted for [11]					(2.231)	0.269	1.394	0.616	0.579	0.941	0.619	0.619	(0.079)	0.306	3.463	4.114

[1] Estimated from part-yearly reports of cited sources.
[2] Does not include NON-RAILBELT items marked ---.
[3] Alaska Oil and Gas Conservation Commission, "Report of Gas Disposition," monthly reports.
[4] Sum of sales from Beluga gas field in: Alaska Oil and Gas Conservation Commission, "Report of Gas Disposition" and
1971-82: Annual reports from Alaska Pipeline Co., ENSTAR and Kenai Utility Service Co. to Alaska Public Utilities Commission
1983-85: Enstar Natural Gas Co., personal communication.
[5] Barrow Utilities and Electric Cooperative Inc., personal communication.
[6] 1971-74: Stanford Research Institute, "Natural Gas Demand and Supply to the Year 2000 in the Cook Inlet Basin of South Central Alaska," Nov. 1977.
1975-79: Sum of 1) production from Kenai and Beaver Creek gas fields in: Alaska Oil and Gas Conservation Commission, "Report of Gas Disposition," and
2) sales from North Cook Inlet gas field in: Alaska Oil and Gas Conservation Commission, "Kenai Gas Sales."
1980-85: Royalty reports from producers to Division of Oil and Gas.
[7] 1971-74: Stanford Research Institute, "Natural Gas Demand and Supply to the Year 2000 in the Cook Inlet Basin of South Central Alaska," Nov. 1977.
1975-79: Sum of 1) sales from Kenai and Beaver Creek gas fields to Collier Chemical in: Alaska Oil and Gas Conservation Commission, "Kenai Gas Sales," and
2) sales from McArthur River gas field in: Alaska Oil and Gas Conservation Commission, "Monthly Report of Gas Disposition."
1980-85: Royalty reports from producers to Division of Oil and Gas.
[8] Royalty reports from Union to Division of Oil and Gas, item Rental Gas.
[9] Royalty reports from Union to Division of Oil and Gas, items Alaska Pipeline-Nikiski, Chevron Rental Gas and Metering.
[10] Royalty reports from ARCO to Division of Oil and Gas.
[11] Calculated difference between "Sold" and sum of listed "Sold" items.
S/D87;T3_3_4;10/15/86

HISTORICAL GAS PRODUCTION

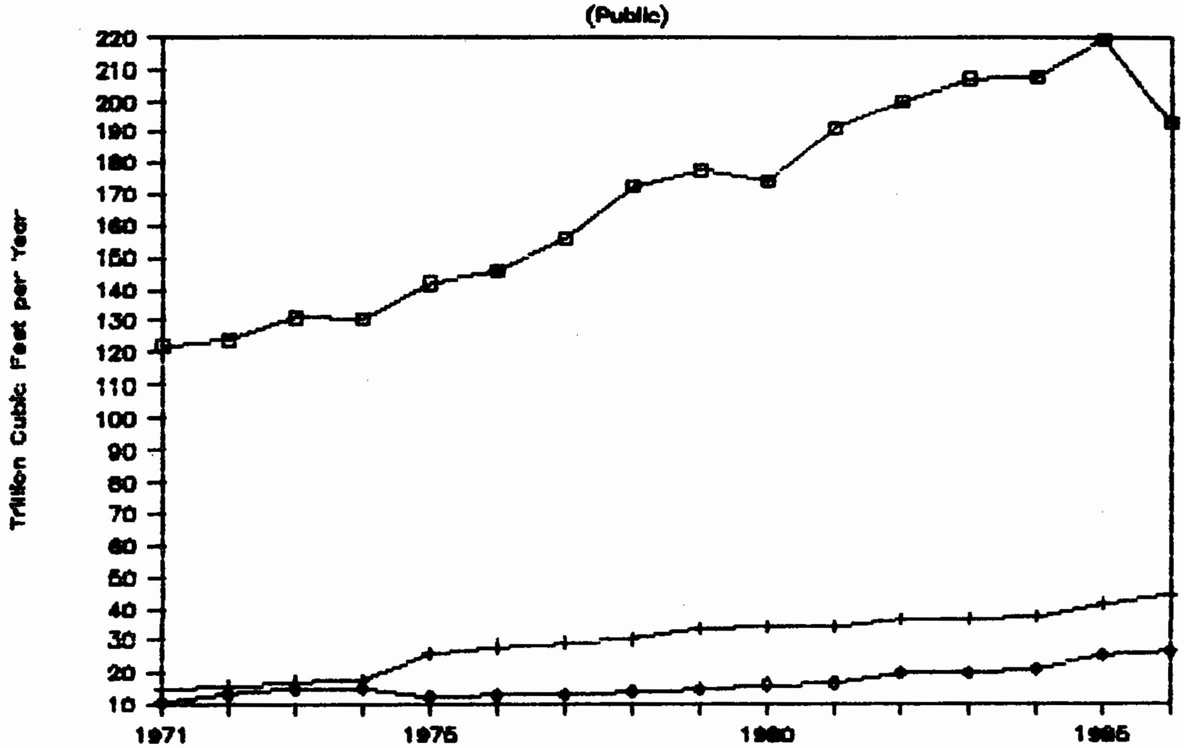
FIGURE 3.3



HISTORICAL GAS CONSUMPTION

FIGURE 3.4

(Public)

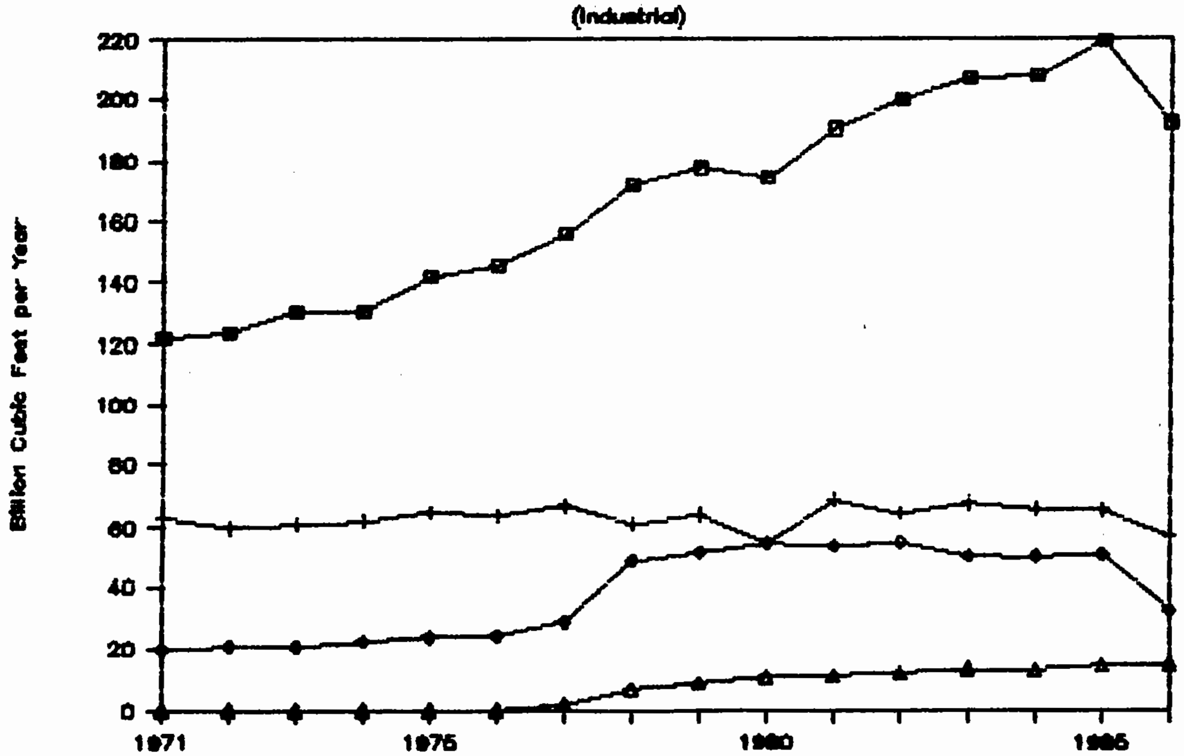


TOTAL SALES + POWER GENERATION ◇ GAS UTILITIES

HISTORICAL GAS CONSUMPTION

FIGURE 3.5

(Industrial)



TOTAL SALES + LNG ◇ AMMONIA/ UREA △ TAPS

A projection of consumption of oil and gas for the 15-year period from 1987 to 2001 was prepared by the Institute of Social and Economic Research (ISER).

Summary

Consumption of oil and gas in most major categories is forecast to increase at a modest rate in future years.[1]

Total consumption of liquid petroleum will increase from 1,486 million gallons in 1987 (about 36 million barrels of crude oil equivalent) to 1,720 million gallons in 2001 (40 million barrels). This represents 1 percent annual growth rate. Space heating use of petroleum will be flat. Vehicle transportation use will increase 1 percent annually. The use of fuel oil for electricity generation reflects the recent and planned introduction of several hydro- electric facilities which replace fuel oil generation. However, in the long run, fuel oil consumption increases, and the 15-year growth rate is 2 percent annually. Industrial use of petroleum liquids will remain constant.

Consumption of natural gas will grow from 246 billion cubic feet in 1987 to 270 billion cubic feet in 2001 (annual growth of 1 percent). Industry will continue to consume the majority of natural gas. The consumption of natural gas for industrial uses will grow from 180 billion cubic feet in 1987 to 202 billion cubic feet in 2001 (1 percent annual growth). Over the next 15 years, use of gas for space heating will increase very little from 26 billion cubic feet in 1987 to 27 billion cubic feet in 2001. Use of gas for electricity generation will remain constant at 40 billion cubic feet.

Transportation Liquid Fuels

Transportation fuel consumption will grow moderately in future years, increasing from 1,189 million gallons in 1987 to 1,400 million gallons in 2001 (Table 4.1). Jet fuel consumption will grow most rapidly (2 percent annually) while diesel fuel consumption will grow slowly and gasoline use will fall slowly.

Total consumption projected over the 15-year period from 1987 to 2001 is 19,149 million gallons. This is equivalent to about 456 million barrels of crude oil.

---

[1]See Appendix B for methodology and assumptions.

Space Heating

The majority of fuel oil used for space heating is consumed outside the railbelt where it is the dominant fuel. Fuel oil consumption for this use is approximately constant--157 million gallons in 1987 and 166 million gallons in 2001.Natural gas use will grow slowly from 26 billion cubic feet in 1987 to 27 billion cubic feet in 2001 (Table 4.2). Barrow, on the North Slope, is the only location outside of the railbelt presently served by natural gas.

Utility Electricity Generation

Fuel oil use for utility electricity generation will grow at an average annual rate of 2 percent. This is due to demand growth in areas where generation from natural gas and hydroelectric plants is not available.

Natural gas use for utility electricity generation will decline in the near term from its current level of 40 billion cubic feet, when the Bradley Lake hydroelectric project backs out some gas use starting in the 1990s. Subsequently, its use will grow and regain the current level by 2001.

Industrial Fuel Use

The major industrial use of fuel oil (not including transportation) is in the petroleum industry. Pipeline fuel for the Alyeska pipeline is the largest element of this use. In addition, a significant amount of fuel is used for electricity generation. Both of these uses are projected at constant levels.

Increased use of natural gas in future years will be related to petroleum production. This increase will be concentrated on the North Slope where more intensive recovery methods will necessitate the use of larger amounts of energy. The other large use of natural gas, the production of ammonia-urea, will continue to require a constant amount of natural gas.

PROJECTED DEMAND FOR OIL (Million Gallons/Year)

TABLE 4.1

YEAR:	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL, 1987-2001	ANNUAL GROWTH
STATE																		
Vehicle Transportation	1,194	1,189	1,191	1,208	1,216	1,227	1,239	1,255	1,269	1,281	1,296	1,313	1,334	1,354	1,377	1,400	19,149	1%
Jet Fuel	549	555	563	576	587	599	611	626	639	652	666	682	699	716	734	753	9,658	2%
Civilian Domestic	293	296	302	313	321	330	339	351	362	372	384	396	410	424	440	456	5,496	3%
Military and International	256	259	261	264	266	269	272	274	277	280	283	286	288	291	294	297	4,162	1%
Gasoline	259	254	250	250	248	247	245	245	244	243	242	241	242	242	242	243	3,678	0%
Aviation	19	18	18	18	18	18	18	18	18	18	18	18	18	19	19	19	276	0%
Highway	231	226	222	222	220	219	218	217	216	215	214	214	214	214	214	214	3,260	0%
Marine	10	9	9	9	9	9	9	9	9	9	9	9	10	10	10	10	142	0%
Diesel	386	381	378	381	381	382	382	385	386	386	388	390	393	396	400	404	5,814	0%
Highway	279	274	272	273	272	272	271	272	272	272	272	273	274	276	277	279	4,103	0%
Marine	107	107	107	108	109	110	111	112	113	114	116	117	119	121	123	125	1,711	1%
Space Heat	163	157	156	159	159	159	159	161	161	162	162	163	164	164	165	166	2,419	0%
Utility Generation	36	35	35	37	38	40	41	42	43	44	45	46	47	48	49	50	639	2%
Industry	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	1,574	0%
Pipeline Fuel	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	1,260	0%
Electricity Generation	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	314	0%
TOTAL	1,499	1,486	1,487	1,510	1,518	1,531	1,544	1,564	1,578	1,591	1,608	1,627	1,650	1,671	1,696	1,720	23,780	1%
RAILBELT																		
Vehicle Transportation	878	886	888	889	895	901	909	919	929	940	951	965	981	999	1,017	1,038	14,105	1%
Jet Fuel	457	467	474	479	486	494	504	514	524	535	546	559	573	588	604	620	7,968	2%
Civilian Domestic	242	247	252	258	264	270	278	286	295	303	312	323	334	346	359	373	4,501	3%
Military and International	215	220	222	221	223	224	226	227	230	232	234	237	239	242	244	247	3,467	1%
Gasoline	193	191	188	186	184	182	181	180	179	178	178	177	178	178	178	179	2,719	0%
Aviation	16	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	226	0%
Highway	172	170	167	165	163	162	160	160	159	158	157	157	157	157	157	158	2,408	0%
Marine	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	85	0%
Diesel	228	227	226	225	224	224	224	225	226	226	227	228	230	233	235	238	3,418	0%
Highway	153	152	150	149	148	147	147	147	147	147	147	147	148	149	150	151	2,225	0%
Marine	75	76	76	76	76	77	77	78	79	79	80	81	82	84	85	87	1,192	1%
Space Heat	61	60	59	58	57	57	57	57	57	57	57	57	58	58	59	59	867	0%
Utility Generation	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	150	0%
Industry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
TOTAL	949	956	957	958	962	967	975	985	996	1,006	1,018	1,032	1,049	1,067	1,086	1,107	15,122	1%
NON-RAILBELT																		
Vehicle Transportation	213	206	206	215	218	221	224	229	231	233	236	239	243	246	250	253	3,448	1%
Jet Fuel	92	87	89	98	101	105	108	112	114	117	120	123	126	128	131	133	1,690	3%
Civilian Domestic	51	49	50	55	57	60	62	65	67	69	71	74	76	78	81	83	995	4%
Military and International	41	39	39	43	44	45	46	47	47	48	49	49	50	50	50	50	695	2%
Gasoline	66	62	62	64	64	64	64	65	65	64	64	64	64	64	64	64	959	0%
Aviation	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	50	1%
Highway	59	56	55	57	57	57	57	58	57	57	57	57	57	57	56	56	852	0%
Marine	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	57	0%
Diesel	158	153	152	157	157	158	158	160	160	160	161	162	163	164	165	166	2,396	1%
Highway	127	123	121	124	124	124	124	125	125	125	126	126	127	127	128	128	1,877	0%
Marine	32	31	31	32	33	33	34	34	35	35	36	36	37	37	37	38	518	1%
Space Heat	102	97	96	101	101	102	103	104	105	105	105	106	106	106	107	107	1,552	1%
Utility Generation	26	25	25	28	29	30	31	32	33	34	35	36	37	38	38	39	489	3%
Southeast	7	7	7	8	8	9	10	11	11	12	12	13	13	14	14	15	163	5%
Rest of State	19	18	18	20	20	21	21	22	22	22	23	23	24	24	24	25	326	2%
Industry	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	1,574	0%
TOTAL	345	336	336	348	351	356	359	366	369	372	376	380	385	388	393	397	5,511	1%

S/D87;T4_1;12/9/86

PROJECTED DEMAND FOR GAS (Billion Cubic Feet/Year)

Table 4.2

YEAR:	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	TOTAL, 1987-2001	ANNUAL GROWTH
STATE																		
Vehicle Transportation [1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Space Heat	25.6	25.7	25.8	26.1	26.3	26.5	26.8	26.9	26.9	26.9	27.0	27.1	27.2	27.3	27.3	27.4	401.2	0%
Utility Generation	39.6	39.6	39.3	39.4	39.5	39.7	35.5	35.9	36.2	36.6	37.0	37.5	38.1	38.8	39.5	40.3	572.9	0%
Industry	176.6	180.4	184.3	188.4	192.8	197.3	202.1	202.1	202.1	202.1	202.1	202.1	202.1	202.1	202.1	202.1	2,964.2	1%
Ammonia-Urea Production	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	750.0	0%
Military Power Generati	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	66.0	0%
Petroleum Production	122.2	126.0	129.9	134.0	138.4	142.9	147.7	147.7	147.7	147.7	147.7	147.7	147.7	147.7	147.7	147.7	2,148.2	1%
Pipeline Fuel	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	220.5	0%
Miscellaneous	107.5	111.3	115.2	119.3	123.7	128.2	133.0	133.0	133.0	133.0	133.0	133.0	133.0	133.0	133.0	133.0	1,927.7	1%
TOTAL	241.9	245.6	249.4	253.9	258.6	263.5	264.4	264.9	265.3	265.6	266.1	266.7	267.4	268.2	269.0	269.8	3,938.3	1%
RAILBELT																		
Vehicle Transportation [1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Space Heat	25.2	25.3	25.4	25.6	25.9	26.1	26.4	26.5	26.5	26.5	26.5	26.6	26.7	26.8	26.8	26.9	394.5	0%
Utility Generation	39.1	39.1	38.8	38.9	39.0	39.1	35.0	35.3	35.7	36.0	36.4	36.9	37.5	38.2	38.9	39.6	564.3	0%
Industry	86.9	86.9	86.9	86.9	86.9	86.9	86.9	86.9	86.9	86.9	86.9	86.9	86.9	86.9	86.9	86.9	1,303.5	0%
Ammonia-Urea Production	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	750.0	0%
Military Power Generati	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	66.0	0%
Petroleum Production	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	487.5	0%
Pipeline Fuel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Miscellaneous	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	487.5	0%
TOTAL	151.3	151.3	151.1	151.4	151.8	152.1	148.2	148.7	149.0	149.4	149.8	150.4	151.1	151.9	152.6	153.4	2,262.3	0%
NON-RAILBELT																		
Vehicle Transportation [1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Space Heat	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	6.7	2%
Utility Generation	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	8.6	2%
Industry	89.7	93.5	97.4	101.5	105.9	110.4	115.2	115.2	115.2	115.2	115.2	115.2	115.2	115.2	115.2	115.2	1,660.7	1%
Pipeline Fuel	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	220.5	0%
Other Petroleum	75.0	78.8	82.7	86.8	91.2	95.7	100.5	100.5	100.5	100.5	100.5	100.5	100.5	100.5	100.5	100.5	1,440.2	2%
TOTAL	90.6	94.3	98.3	102.5	106.8	111.4	116.2	116.2	116.2	116.2	116.3	116.3	116.3	116.3	116.4	116.4	1,676.0	1%

[1] Includes industrial,military, and government use. Excludes
S/D87;T4_2;12/10/86

CHAPTER 5
ANALYSIS OF SURPLUS

Summary

Under reasonable assumptions about available reserves and Alaska consumption, the current inventories of both oil and gas are more than sufficient to meet the presently identifiable needs of Alaskans for the next 15 years.

Liquid Petroleum

Table 5.1 shows that the cumulative 15-year Alaska demand for liquid petroleum is approximately 566 million barrels of crude oil equivalent. This is equal to approximately two-thirds of the reserves of royalty oil and 8 percent of total reserves in the state.

It is recognized that a direct volume-for-volume comparison between demand for refined products and availability of crude oil is not representative of actual conditions. A direct comparison is unrealistic since a barrel of crude oil does not yield a barrel of specific refined products. Outputs and efficiencies differ between refineries, and a given refinery can alter its product output. If it is assumed that on a statewide basis the refineries convert two-thirds of their crude oil feedstock into refined products used in Alaska, then the total volume of royalty oil available over the next 15 years more or less equals the projected consumption levels of refined products over that same time period. Because of depletion of the oil resource, the volume of available royalty oil will fall below the projected refined products consumption level in about 1997 when using a straight (though not realistic) barrel-for-barrel comparison. Using a conversion factor for crude oil to refined products of two-thirds results in the availability of royalty oil on an annual basis falling below the consumption level of refined products in the mid-1990s.

Historically, in-state refiners have purchased both state royalty oil and oil sold by the individual lessees (Standard, Exxon, ARCO, Texaco, etc.). Price terms, contract length, and transportation considerations are a few of the factors that enter into that decision process. It is not unrealistic to assume that in-state refiners will, at least on a limited basis, continue to purchase oil other than state royalty oil as refinery feedstock. However, it is unrealistic to assume that state royalty oil will or should provide the only source of feedstock for in-state refiners over the next 15 years. At present, no royalty crude oil is taken in-kind and sold for export. Approximately 3,600 barrels per day of Cook Inlet royalty oil will be exported commencing in July 1987.

Based on current projections, sufficient feedstocks will be available regardless of the supply sources chosen by the in-state refiners.

No attempt has been made to compare the total volume of petroleum products produced at Alaska refineries with the total volume of petroleum products consumed in the state. Currently the capacity of Alaska refineries exceeds Alaskan consumption (about 97 thousand barrels per day). But, owing to technical constraints, the product mix which the refineries can produce does not match the product mix demanded (Figures 3.6 through 3.11). The resulting cross-hauling of crude oil out of Alaska and refined products (motor oils, specialty lubricants, etc.) into the state is a common feature of petroleum markets, in general, and does not represent an inefficient distribution of refining capacity or mismatch of supply and demand.

Natural Gas

Table 5.1 indicates that the cumulative 15-year Alaska demand for natural gas is 3.938 trillion cubic feet of gas. This is about 93 percent of the state royalty share of gas in the combined current inventory at Cook Inlet and on the North Slope.

Since the transportation of natural gas normally requires a pipeline, particular markets for gas which are linked by pipeline to supplies are relevant for the determination of excess supply. Table 5.1 shows that there is a net surplus in both the Cook Inlet and North Slope markets. The Alaskan royalty share of Cook Inlet gas alone, however, would be insufficient to meet projected Cook Inlet requirements over the next 15 years. At present, no royalty gas is taken in-kind and sold for export.

Projections Beyond Current Inventory

We assume reserves represent a 15-year inventory of petroleum in the ground based upon historical reserve-to-production ratios. Because a very sizable investment is required to develop a petroleum reservoir into recoverable reserves, reserves will be "proven up" at a rate to maintain sufficient inventory consistent with the growth in demand. Excessive development reserves, like excessive inventories, result in unnecessary carrying costs to reservoir equity owners and will be avoided if possible. This is the basis for the 15-year time horizon for demand used in this analysis. As time passes, the growth in demand will stimulate the search for reserves to replace those produced, and market forces will work to keep supply and demand in balance.

Sensitivity of Results

The net surpluses of oil and gas calculated in this chapter are largely insensitive to a reasonable range of changes in the assumptions underlying the projections. These are discussed in turn and shown in Table 5.2.

Economic Growth

Faster population growth will accelerate the use of liquid fuels relative to the use of natural gas because a larger portion of liquid fuel use is population sensitive. Even so, the net surplus of petroleum liquids would be reduced only marginally by growth of population based on a rapid economic growth scenario (see Appendix B).

Export of Gas

To the extent natural gas is exported, it is unavailable for the local market. Cumulative exports over the next 15 years from current operations are projected to be about 945 billion cubic feet. If a facility comparable to the once-proposed Pacific Alaska LNG project were built, it would annually export 160 billion cubic feet. With an assumed first year of operation of 1990, cumulative exports through 2001 would be 1,920 billion cubic feet. Total exports would be 2,865 billion cubic feet, reducing reserves for in-state use, and the net surplus. If a new export facility were to be constructed, it is anticipated that exploration for natural gas in Cook Inlet would accelerate (it is currently at a near standstill) and additional reserves would likely be discovered, once again creating a surplus condition.

Natural Gas Availability in Fairbanks

If, by some means, natural gas became available in Fairbanks, space heating in Fairbanks might be converted to gas. This could increase annual natural gas consumption as fuel oil use was backed out. Fuel oil use could fall by 8 million gallons annually.

Natural gas consumption for space heating might eventually capture 75 percent of the market. If gas became available in 1993 and captured this share of the market by 1997, gas consumption for space heat could increase 30 billion cubic feet, and fuel oil consumption could fall by 175 million gallons over the projection period.

The net surplus of gas would fall very marginally as a result of these changes, and the net surplus of liquid fuels would increase very marginally.

	OIL (Thousand Barrels)		GAS (Billion Cubic Feet)	
	Total	State Royalty	Total	State Royalty
STATE				
Reserves [1]	7,427	933	35,677	4,261
Estimated Production from reserves thru 1986[2]	128	32	240	45
Estimated reserves as of Jan. 1, 1987	7,299	901	35,437	4,216
Estimated cumulative consumption, 1987-2001 (15 years)	566	566	3,938	3,938
NET SURPLUS (DEFICIT)	6,733	335	31,499	278
COOK INLET				
Reserves [1]	100	11	4,377	336
Estimated Production from reserves thru 1986[2]	16	2	220	17
Estimated reserves as of Jan. 1, 1987	84	9	4,157	319
Estimated cumulative consumption, 1987-2001 (15 years)	360	360	2,262	2,262
NET SURPLUS (DEFICIT)	(276)	(351)	1,895	(1,943)
NORTH SLOPE				
Reserves [1]	7,327	922	31,300	3,925
Estimated Production from reserves thru 1986[2]	112	14	20	3
Estimated reserves as of Jan. 1, 1987	7,215	922	31,280	3,925
Estimated cumulative consumption, 1987-2001 (15 years)	566	566	1,676	1,676
NET SURPLUS (DEFICIT)	6,649	356	29,604	2,249

[1] From Table 2.1:North Slope as of 10/86, Cook Inlet as of 1/86.
[2] Author's estimate of production to year end. Production from state royalty share is proportional to state royalty share of reserve.
S/D87;T5_1;12/10/86

TABLE 5.2. SENSITIVITY ANALYSIS OF OIL AND GAS SURPLUS

	Percent Reduction in Net Surplus	
	Oil (million barrels)	Gas (billion cubic feet)
Low Reserve Estimate	24%	1%
Rapid Population Growth	1%	0%
Export of LNG	--	9%
Natural Gas available in Fairbanks	+0%	0%

APPENDIX A.1

OIL AND GAS FIELD PRODUCTION DATA

FIELD BELUGA RIVER
LOCATION Cook Inlet, onshore, west side
BEGAN PRODUCTION 1/68
OWNER ARCO, Chevron, Shell
OPERATOR Chevron

	OIL		GAS Casinghead		Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	2,164,000 MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	229,805,000 MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	763,185,000 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		23%

ROYALTY 12.5%, Effective rate: 7.555%

PURCHASER Chugach Electric, ENSTAR

LEASES State ADL: 17592, 17599, 17658, 21126, 21127, 21128, 21129, 58815, 58820, 58831

COMMENTS
Until recently, Chugach Electric was the only current purchaser of this gas. Chugach uses this gas for power generation which is delivered to the Anchorage market.

Enstar has recently purchased Beluga River gas under contract from Shell and just completed a pipeline from the field through the Mat-Su Valley to Anchorage.

Due to the existence of several Federal leases, the state's effective royalty share is 7.555%.

FIELD CANNERY LOOP
LOCATION Cook Inlet, onshore, east side
BEGAN PRODUCTION Field delineation underway
OWNER
OPERATOR Union

	OIL		GAS Casinghead		Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	--- MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	--- MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	300,000,000 MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		---

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS
Production to commence in 1986.

FIELD DUCK ISLAND / SAG DELTA (ENDICOTT RESERVOIR)
LOCATION North Slope, onshore/offshore
BEGAN PRODUCTION Facilities design underway, production expected to begin in 1988.
OWNER
OPERATOR SOHIO

	OIL		GAS Casinghead		GAS Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED RESERVES AS OF 12/31/86	375,000,000	Bbl	---	MCF	800,000,000	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		---	

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS

FIELD FALLS CREEK
LOCATION Cook Inlet, onshore, east side
BEGAN PRODUCTION Shut-in 1961
OWNER
OPERATOR Chevron

	OIL		GAS Casinghead		GAS Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	18,983	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	13,000,000	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		<1%	

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS

FIELD	GRANITE POINT
LOCATION	Cook Inlet, offshore, west side
BEGAN PRODUCTION	12/67
OWNER	AMOCO, ARCO, Chevron, Getty, Mobil, Phillips, Superior, Texaco, Union
OPERATOR	AMOCO, ARCO, Texaco, Union

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	270,000 Bbl	192,000 MCF	--- MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	104,126,000 Bbl	89,530,000 MCF	--- MCF
ESTIMATED RESERVES AS OF 12/31/86	18,756,000 Bbl	12,700,000 MCF	--- MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	85%	88%	---

ROYALTY 12.5 %

PURCHASER Tesoro
ARCO [1]
AMOCO Platform [1]
Union [1]

[1] Small amount of casinghead gas sold to AMOCO for use on platform.

LEASES State ADL: 17586, 17587, 18742, 18761

COMMENTS
Gas from this field is casinghead gas and was formerly flared. DOGC Flaring Order #104, 6/30/71, has prohibited flaring since 7/1/72 and this gas is now recovered and used locally.

FIELD	GWYDYR BAY UNIT AREA
LOCATION	North Slope, onshore/offshore
BEGAN PRODUCTION	Field delineation underway
OWNER	
OPERATOR	Conoco

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	--- Bbl	--- MCF	--- MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	--- Bbl	--- MCF	--- MCF
ESTIMATED RESERVES AS OF 12/31/86	10,000,000 Bbl	--- MCF	--- MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---	---	---

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS

FIELD HEMI SPRINGS UNIT AREA
LOCATION North Slope, onshore
BEGAN PRODUCTION Unit agreement approved in 1984.
OWNER
OPERATOR ARCO

	OIL		GAS Casinghead		Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		---	

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS

FIELD IVAN RIVER
LOCATION Cook Inlet, onshore, west side
BEGAN PRODUCTION Shut-in 1966, suspended
OWNER
OPERATOR Chevron

	OIL		GAS Casinghead		Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	[1]	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		---	

[1] Ivan River, Lewis River, Pretty Creek and Stump Lake reserves are combined under Lewis River reserves, below.

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS

FIELD	KAVIK
LOCATION	North Slope, onshore
BEGAN PRODUCTION	Suspended
OWNER	
OPERATOR	ARCO

	OIL		GAS Casinghead		GAS Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	No Data	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		---	

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS

FIELD	KENAI
LOCATION	Cook Inlet, onshore, east side
BEGAN PRODUCTION	1/62
OWNER	ARCO, Chevron, Marathon, Union
OPERATOR	Union

	OIL		GAS Casinghead		GAS Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	6,811,000	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	11,877	Bbl [1]	---	MCF	1,739,600,000	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	721,943,000	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		71%	

[1] Natural gas liquids.

ROYALTY 12.5%, Effective rate: Kenai, 2.06879%; Kenai Deep, 0.0%

PURCHASER
- Alaska Pipeline
- Chevron
- City of Kenai
- Marathon LNG
- Rental gas (Swanson River oil field)
- Union
- Union-Chevron exchange

LEASES State ADL: 00588, 00593, 00594, 02411, 308223, 324598

COMMENTS

The Kenai Unit provides most of the gas sales in the Cook Inlet area.

The state does not receive the full 12.5% royalty share because of the predominance of Federal leases in the unit and the conveyance of land to Cook Inlet Region Inc.

FIELD	KUPARUK
LOCATION	North Slope, onshore
BEGAN PRODUCTION	12/81
OWNER	ARCO, BP, Chevron, Exxon, Mobil, Phillips, Sohio, Union
OPERATOR	ARCO

	OIL	GAS Casinghead-Gross	GAS Casinghead-Net	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	8,001,000 Bbl [1]	7,704,000 MCF	1,972,000 MCF	--- MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	295,256,000 Bbl [1]	337,647,000 MCF	174,583,000 MCF	--- MCF
ESTIMATED RESERVES AS OF 12/31/86	1,009,992,000 Bbl	--- MCF	590,141,000 MCF	--- MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	23%	---	23%	---

[1] Includes NGL.

ROYALTY 12.5 %

PURCHASER All owners

LEASES State ADL:

25512, 25513, 25519, 25520, 25521, 25522, 25523, 25524, 25527, 25531
25532, 25545, 25546, 25547, 25548, 25549, 25550, 25567, 25568, 25569
25570, 25571, 25572, 25573, 25583, 25584, 25585, 25586, 25587, 25588
25589, 25590, 25591, 25592, 25601, 25602, 25603, 25604, 25605, 25606
25607, 25608, 25609, 25610, 25628, 25629, 25630, 25631, 25632, 25633
25634, 25635, 25636, 25637, 25638, 25639, 25640, 25641, 25642, 25643
25644, 25645, 25646, 25647, 25648, 25649, 25650, 25651, 25652, 25653
25654, 25655, 25656, 25657, 25658, 25659, 25660, 25661, 25664, 25665
25666, 25667, 25668, 25669, 25670, 25671, 25672, 25673, 25674, 25675
25676, 25677, 25678, 25679, 25680, 25681, 25684, 25685, 25686, 25687
25689, 25690, 25691, 25695, 28234, 28236, 28242, 28244, 28247, 28248
47449, 81230, 318602, 318603, 318605, 318628, 318630, 348923, 348924
348924, 355023, 355024, 355030

COMMENTS

FIELD	LEWIS RIVER
LOCATION	Cook Inlet, onshore, west side
BEGAN PRODUCTION	1984
OWNER	
OPERATOR	Cities Service

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	--- Bbl	--- MCF	124,000 MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	--- Bbl	--- MCF	3,824,000 MCF
ESTIMATED RESERVES AS OF 12/31/86	--- Bbl	--- MCF	499,382,000 MCF [1]
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---	---	<1%

[1] Ivan River, Lewis River, Pretty Creek and Stump Lake reserves are combined under Lewis River reserves.

ROYALTY 12.5%

PURCHASER /Bbl /MCF

LEASES State ADL: 58798, 58799, 58800, 58801, 58802, 58803, 58804, 58805, 58806, 75999

COMMENTS
Short term gas sales to Enstar began in 1984.

FIELD	LISBURNE RESERVOIR
LOCATION	North Slope, onshore/offshore
BEGAN PRODUCTION	Field delineation and facilities design underway, production expected to begin in 1986-87.
OWNER	
OPERATOR	ARCO

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	252,000 Bbl	392,000 MCF	--- MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	4,740,000 Bbl	8,074,000 MCF	--- MCF
ESTIMATED RESERVES AS OF 12/31/86	398,739,000 Bbl	897,478,000 MCF	--- MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	1%	1%	---

ROYALTY 12.5%

PURCHASER

LEASES State ADL:

COMMENTS

FIELD	MCARTHUR RIVER
LOCATION	Cook Inlet offshore, west side
BEGAN PRODUCTION	12/69
OWNER	AMOCO, ARCO, Chevron, Getty, Marathon. Phillips, Union
OPERATOR	Union

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	691,000 Bbl [1]	280,000 MCF	739,000 MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	523,056,000 Bbl [1]	190,099,000 MCF	123,367,000 MCF
ESTIMATED RESERVES AS OF 12/31/86	42,709,000 Bbl	--- MCF [2]	644,552,000 MCF [3]
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	92%	---	33%

[1] Includes NGL.
[2] Included under Gas Well reserves.
[3] Trading Bay reserves are combined with McArthur River reserves.

ROYALTY 12.5 %

PURCHASER Tesoro

LEASES State ADL: 17579, 17594, 17602, 18716, 18729, 18730, 18758, 18772, 18777, 21068

COMMENTS

Gas from this field is casinghead gas and was formerly flared. DOGC Flaring Order #104, 6/30/71, has prohibited flaring since 7/1/72 and this gas is now recovered and used locally.

FIELD	MIDDLE GROUND SHOAL
LOCATION	Cook Inlet, offshore, east side
BEGAN PRODUCTION	9/67
OWNER	AMOCO, ARCO, Chevron, Getty, Phillips, Shell
OPERATOR	AMOCO, Shell

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	270,000 Bbl	175,000 MCF	36,000 MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	150,308,000 Bbl	76,372 MCF	1,913,000 MCF
ESTIMATED RESERVES AS OF 12/31/86	8,758,000 Bbl	5,458,000 MCF	--- MCF [1]
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	94%	94%	---

[1] Included under Casinghead reserves.

ROYALTY 12.5 %

PURCHASER Tesoro

LEASES State ADL: 17595, 18754, 18756

COMMENTS
Recent increases in gas prices may encourage a reevaluation of this gas.

Gas from this field is casinghead gas and was formerly flared. DOGC Flaring Order #104, 6/30/71, has prohibited flaring since 7/1/72 and this gas is now recovered and used locally.

FIELD	MILNE POINT
LOCATION	North Slope, onshore
BEGAN PRODUCTION	Production commenced in 1985.
OWNER	Champlin, Chevron, Cities Service, CONOCO, Reading & Bates
OPERATOR	Conoco

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	457,000 Bbl	135,000 MCF	--- MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	6,184,000 Bbl	1,869,000 MCF	--- MCF
ESTIMATED RESERVES AS OF 12/31/86	53,717,000 Bbl	--- MCF	--- MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	10%	---	---

ROYALTY Estimated effective rate, 18%.

PURCHASER

LEASES State ADL: 25509, 25516, 25518, 315848, 47433, 47434, 47437, 47438

COMMENTS

FIELD	NICOLAI CREEK
LOCATION	Cook Inlet, onshore-offshore, west side
BEGAN PRODUCTION	10/68, now shut-in
OWNER	Superior, Texaco
OPERATOR	Texaco

	OIL		GAS Casinghead		GAS Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	1,062,055	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	3,000,000	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		26%	

ROYALTY 12.5 %

PURCHASER AMOCO

LEASES State ADL: 17585, 17598, 63279

COMMENTS
Gas from this small field, when produced, is used only by platform and shore production facilities. At present there is no production and no prospective purchaser for the state's royalty share.

FIELD	NORTH COOK INLET
LOCATION	Cook Inlet, offshore, mid-channel
BEGAN PRODUCTION	3/69
OWNER	Phillips
OPERATOR	Phillips

	OIL		GAS Casinghead		GAS Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	3,395,000	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	774,361,000	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	800,004,000	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		49%	

ROYALTY 12.5 %

PURCHASER Alaska Pipeline
Phillips

LEASES State ADL: 17589, 17590, 18740, 18741, 37831

COMMENTS
Gas from this field is primarily delivered to the Phillips LNG plant and subsequently sold in Japan.

FIELD	NORTH FORK
LOCATION	Cook Inlet, onshore, east side
BEGAN PRODUCTION	Shut-in 1965
OWNER	
OPERATOR	Chevron

	OIL		GAS Casinghead		Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	104,595	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	12,000,000	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		1%	

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS

FIELD	POINT THOMSON UNIT AND FLAXMAN ISLAND
LOCATION	North Slope, onshore/offshore
BEGAN PRODUCTION	Shut-in
OWNER	
OPERATOR	EXXON

	OIL		GAS Casinghead		Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED RESERVES AS OF 12/31/86	350,000,000	Bbl [1]	5,000,000,000	MCF [1]	---	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		---	

[1] Oil and gas condensate.

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS
Unit Area expansion approved in 1984. Market analysis underway to determine development potential ofgas condensate and natural gas liquids production and sales from the unit.

FIELD	PRUDHOE BAY - SADLEROCHIT RESERVOIR
LOCATION	North Slope, onshore
BEGAN PRODUCTION	10/69
OWNER	Amerada-Hess, ARCO, BP, Chevron, Exxon, Getty, LL&E, Marathon, Mobil, Phillips, Shell, Sohio
OPERATOR	ARCO, Sohio

	OIL	GAS Casinghead-Gross	GAS Casinghead-Net	Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	47,001,000 Bbl [1]	82,129,000 MCF	7,325,000 MCF	--- MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	4,922,166 Bbl [1]	6,438,680,000 MCF	601,763,000 MCF	--- MCF
ESTIMATED RESERVES AS OF 12/31/86	5,250,993,000 Bbl	--- MCF	28,963,375,000 MCF	--- MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	48%	---	2%	---

[1] Includes NGL.

ROYALTY 12.5%

PURCHASER Mapco-GVEA
Tesoro
Chevron

LEASES State ADL: 25637, 28238, 28239, 28240, 28241, 28244, 28245, 28246, 28257, 28258
28259, 28260, 28261, 28262, 28263, 28264, 28265, 28275, 28276, 28277
28278, 28279, 28280, 28281, 28282, 28283, 28284, 28285, 28286, 28287
28288, 28289, 28290, 28299, 28300, 28301, 28302, 28303, 28304, 28305
28306, 28307, 28308, 28309, 28310, 28311, 28312, 28313, 28314, 28315
28316, 28320, 28321, 28322, 28323, 28324, 28325, 28326, 28327, 28328
28329, 28330, 28331, 28332, 28333, 28334, 28335, 28339, 28343, 28345
28346, 28349, 34628, 34629, 34630, 34631, 34632, 47446, 47447, 47448
47449, 47450, 47451, 47452, 47453, 47454, 47469, 47471, 47472, 47475
47476

COMMENTS
The state's royalty share of oil produced is 12.5%, with 14.9% of this share presently being taken in kind and sold to North Pole Refinery and Golden Valley Electric Assn. An additional 35.5178% of the state's share is taken in kind and sold to Tesoro. The remainder is taken in value. Additional royalty oil sales in 1984 are contemplated to be taken in value.

Small amounts of produced gas are presently sold to the Trans-Alaska Pipeline. There presently is no other market. The state's roualty share of gas is 12.5%, which is taken in-value.

Unit Area expansion approved 1984, with additional development work continuing.

FIELD	STERLING
LOCATION	Cook Inlet, onshore, east side
BEGAN PRODUCTION	5/62
OWNER	Marathon, Union
OPERATOR	Union

	OIL		GAS Casinghead		Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	217	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	2,089,000	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	22,998,000	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		8%	

ROYALTY 12.5%, Effective rate, 1.55461%

PURCHASER Sport Lake Greenhouse

LEASES State ADL: 02497, 320912, 324599

COMMENTS
Since Federal and Cook Inlet Region Inc. leases are included, the state's royalty share is approximately 1.6%. The only gas sold from this field is consumed locally. There is no gas pipeline currently available to deliver this gas from this field to any other market. Because of limited reserves, there is no current prospect of additional markets.

FIELD	STUMP LAKE UNIT AREA
LOCATION	Cook Inlet, onshore, west side
BEGAN PRODUCTION	Suspended
OWNER	
OPERATOR	Chevron

	OIL		GAS Casinghead		Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	[1]	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		---	

[1] Ivan River, Lewis River, Pretty Creek and Stump Lake reserves are combined under Lewis River reserves, above.

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS

FIELD	PRETTY CREEK UNIT AREA
LOCATION	Cook Inlet, onshore, west side
BEGAN PRODUCTION	Suspended
OWNER	
OPERATOR	Chevron

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	--- Bbl	--- MCF	--- MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	--- Bbl	--- MCF	--- MCF
ESTIMATED RESERVES AS OF 12/31/86	--- Bbl	--- MCF	[1] MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---	---	---

[1] Ivan River, Lewis River, Pretty Creek and Stump Lake reserves are combined under Lewis River reserves, above.

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS
Production to commence in 1986 with delivery of gas to Enstar.

FIELD	TRADING BAY
LOCATION	Cook Inlet, offshore, west side
BEGAN PRODUCTION	12/67
OWNER	Marathon, Union
OPERATOR	Union

	OIL	GAS Casinghead	GAS Gas Well
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	86,000 Bbl [1]	85,000 MCF	26,000 MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	88,478,000 Bbl [1]	59,895,000 MCF	2,692,000 MCF
ESTIMATED RESERVES AS OF 12/31/86	963,000 Bbl	--- MCF	[2] MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	99%	---	---

[1] Includes NGL.
[2] Trading Bay reserves are combined with McArthur River reserves, above.

ROYALTY 12.5 %

PURCHASER Tesoro

LEASES State ADL: 18731

COMMENTS
Gas from this field is casinghead gas and formerly was flared. DOGC Flaring Order #104, 6/30/71, has prohibited flaring since 7/1/72, and this gas is now recovered and used locally.

FIELD WEST FORK
LOCATION Cook Inlet, onshore, east side
BEGAN PRODUCTION Shut-in gas field.
OWNER
OPERATOR

	OIL		GAS Casinghead		Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	0	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	---	Bbl	---	MCF	1,542,000	MCF
ESTIMATED RESERVES AS OF 12/31/86	---	Bbl	---	MCF	6,000,000	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		20%	

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS

FIELD WEST SAK RESERVOIR
LOCATION North Slope, onshore
BEGAN PRODUCTION Pilot production underway
OWNER
OPERATOR ARCO, Conoco

	OIL		GAS Casinghead		Gas Well	
AVERAGE MONTHLY PRODUCTION 1/1/86 thru 7/31/86	---	Bbl	---	MCF	---	MCF
ESTIMATED CUMULATIVE PRODUCTION AS OF 12/31/86	3,365	Bbl	4,980	MCF	---	MCF
ESTIMATED RESERVES AS OF 12/31/86	N/D	Bbl	N/D	MCF	---	MCF
ESTIMATED PERCENT OF FIELD DEPLETED AS OF 12/31/86	---		---		---	

ROYALTY

PURCHASER

LEASES State ADL:

COMMENTS
Reservoir delineation and engineering/geological studies continuing.

S/D87;APXA_1; 12/4/86

APPENDIX A.2

COOK INLET LEASE OWNERSHIP

	LEASE OWNERSHIP		AVERAGE MONTHLY PRODUCTION		
	Working Interest	% of field	Total	State Royalty Share	
			Mcf/Mo.	%	Mcf/Mo.
BEAVER CREEK [1]					
Unocal	50.00%		617,727	0.000%	
Marathon	50.00%		617,727	0.000%	
====			==========		
TOTAL			1,235,454		
BELUGA RIVER [1]					
Well 214-35					
Chevron	100.00%		135,640	7.555%	10,248
Chugach		7.13%	127,587	7.555%	9,639
Enstar		0.45%	8,053	7.555%	608
All Other Wells					
Chevron	33.33%		651,567	7.555%	49,226
Chugach		28.70%	606,945	7.555%	45,855
Enstar		2.11%	44,622	7.555%	3,371
ARCO	33.33%		651,567	7.555%	49,226
Chugach		28.70%	606,945	7.555%	45,855
Enstar		2.11%	44,622	7.555%	3,371
Shell	33.33%		651,567	7.555%	49,226
Chugach		28.70%	606,945	7.555%	45,855
Enstar		2.11%	44,622	7.555%	3,371
----			----------		
Subtotal- Chugach			1,948,422		
Subtotal- Enstar			141,919		
====			============		
TOTAL			2,090,341		
GRANITE POINT [1]					
Granite Point I					
Mobil	75.00%		4,840	12.500%	605
AMOCO					
Marathon					
Unocal	25.00%		1,614	12.500%	202
AMOCO					
Marathon					
Granite Point II					
AMOCO	25.00%		0	12.500%	
ARCO	12.50%		0	12.500%	
Chevron	12.50%		0	12.500%	
Getty	25.00%		0	12.500%	
Phillips	25.00%		0	12.500%	
====			============		
TOTAL			6,454		
KENAI [1]					
Kenai Unit					
Unocal	50.00%				
APL-Anchorage		6.54%	531,687	2.077%	11,043
Unocal-Chevron Exchange		0.20%	16,638	2.077%	346
City of Kenai		0.32%	26,351	2.077%	547
Rental		4.20%	341,794	2.077%	7,099
Rental-Additional		1.75%	142,108	2.077%	2,951
Rental-Chevron			0		
Unocal Chemical		35.00%	2,847,173	2.077%	59,134
Unocal-Marathon Exchange		0.67%	54,778	2.077%	
Marathon	50.00%				
APL I		11.52%	937,172	2.069%	19,388
APL-Nikiski		0.16%	12,959	2.069%	268
APL II		2.68%	218,251	2.069%	4,515
City of Kenai		0.27%	21,623	2.069%	447
Rental		3.74%	304,045	2.069%	6,290
Rental-Additional		1.35%	109,876	2.069%	2,273
Rental-Chevron			0		
LNG		12.75%	1,036,937	2.069%	21,452
CIGGS Exchange		-0.27%	(21,718)	2.069%	(449)
Tesoro		0.89%	72,493	2.069%	1,500

	LEASE OWNERSHIP		AVERAGE MONTHLY PRODUCTION		
	Working Interest	% of field	Total	State Royalty Share	
TRADING BAY [1]					
A-6					
Marathon	33.33%				
CIGGS			25	12.500%	3
Union	33.33%				
CIGGS			25	12.500%	3
Mobil	16.67%				
CIGGS			12	12.500%	2
Texaco	16.67%				
CIGGS			12	12.500%	2
A-15					
Marathon	35.00%				
CIGGS			11	12.500%	1
Union	35.00%				
CIGGS			11	12.500%	1
Mobil	15.00%				
CIGGS			5	12.500%	1
Texaco	15.00%				
Non-Pool			5	12.500%	1
Union	50.00%				
CIGGS			478	12.500%	60
Marathon	50.00%				
CIGGS			478	12.500%	60
====			==========		
TOTAL			1,062		

[1] Royalty reports from producers to Division of Oil and Gas, 7/1/85 thru 6/30/86.
[2] Alaska Oil and Gas Conservation Commission, "Report of Gas Disposition," 7/31/85 thru 6/30/86.
S/D87;Apx_A2;12/2/86

APPENDIX A.3

COOK INLET FIELD OWNERSHIP

		LEASE	OIL P/A Tract Factor	OIL Lessor's % of Lease	OIL Lessor's % of P/A	GAS P/A Tract Factor	GAS Lessor's % of Lease	GAS Lessor's % of P/A
BEAVER CREEK FIELD *								
FEDERAL								
Marathon	100.000%	002-028078	---	---	---	0.2260000%	100.0000000%	0.2260000%
		002-028083	100.0000000%	82.8125000%	82.8125000%	40.3970000%	100.0000000%	40.3970000%
		002-028118	---	---	---	18.4960000%	100.0000000%	18.4960000%
		002-028120	---	---	---	0.1760000%	100.0000000%	0.1760000%
		002-050293	---	---	---	8.1300000%		8.1300000%
			100.0000000%		82.8125000%	67.4250000%		67.4250000%
CIRI								
Marathon	100.000%	002-028078	---	---	---	7.9040000%	100.0000000%	7.8405018%
		002-028083	100.0000000%	17.1875000%	17.1875000%	8.3840000%	100.0000000%	8.3165326%
		002-028118	---	---	---	13.2110000%	100.0000000%	13.1048177%
		002-028120	---	---	---	3.0760000%	100.0000000%	3.0512813%
		002-050293	---	---	---	0.0000000%		
			100.0000000%		17.1875000%	32.5750000%		32.3131334%
		TOTAL: FEDERAL+CIRI			100.0000000%			100.0000000%

* Oil is accounted for at lease level, whereas gas is accounted for at unit level.

		LEASE	OIL P/A Tract Factor	OIL Lessor's % of Lease	OIL Lessor's % of P/A	GAS P/A Tract Factor	GAS Lessor's % of Lease	GAS Lessor's % of P/A
BELUGA RIVER UNIT								
STATE								
Chevron	33.330%	ADL-17658	---	---	---	12.7251000%	100.0000000%	12.7251000%
Arco	33.330%	ADL-17592	---	---	---	7.0085000%	100.0000000%	7.0085000%
Shell	33.340%	ADL-17599	---	---	---	6.0147000%	100.0000000%	6.0147000%
Well #214-35:		ADL-21126	---	---	---	0.7857000%	100.0000000%	0.7857000%
Chevron	100.000%	ADL-21127	---	---	---	9.4019000%	100.0000000%	9.4019000%
		ADL-21128	---	---	---	14.5560000%	100.0000000%	14.5560000%
		ADL-21129	---	---	---	0.5799000%	100.0000000%	0.5799000%
		ADL-58815	---	---	---	0.0158000%	100.0000000%	0.0158000%
		ADL-58820	---	---	---	1.5893000%	100.0000000%	1.5893000%
		ADL-58831	---	---	---	7.7633000%	100.0000000%	7.7633000%
						60.4402000%		60.4402000%
FEDERAL								
Chevron	33.330%	02-029656	---	---	---	11.7880000%	98.3034000%	11.5880048%
Arco	33.330%	02-029657	---	---	---	27.5218000%	100.0000000%	27.5218000%
Shell	33.340%							
Well #214-35:						39.3098000%		39.1098048%
Chevron	100.000%							
CIRI								
Chevron	33.330%	02-029656	---	---	---	11.7880000%	1.6966000%	0.1999952%
Arco	33.330%							
Shell	33.340%							
Well #214-35:								
Chevron	100.000%							
FEE SIMPLE INTEREST								
Chevron	33.330%	FEE SIMPLE	---	---	---	0.2500000%	100.0000000%	0.2500000%
Arco	33.330%							
Shell	33.340%							
		TOTAL: FEDERAL+CIRI						39.3098000%
		TOTAL: STATE+FEDERAL+CIRI						99.7500000%
		TOTAL: STATE+FEDERAL+CIRI+FEE SIMPLE						100.0000000%

		LEASE	OIL P/A Tract Factor	OIL Lessor's % of Lease	OIL Lessor's % of P/A	GAS P/A Tract Factor	GAS Lessor's % of Lease	GAS Lessor's % of P/A
GRANITE POINT FIELD								
STATE								
Group 1								
Mobil	75.000%	ADL-18761	100.0000000%	100.0000000%	100.0000000%	100.0000000%	100.0000000%	100.0000000%
Union	25.000%							
Group 2								
Amoco	25.000%	ADL-17586	2.1040000%	100.0000000%	2.1040000%	2.1040000%	100.0000000%	2.1040000%
Arco	12.500%	ADL-17587	1.2430000%	100.0000000%	1.2430000%	1.2430000%	100.0000000%	1.2430000%
Chevron	12.500%	ADL-18742	96.6530000%	100.0000000%	96.6530000%	96.6530000%	100.0000000%	96.6530000%
Getty	25.000%							
Phillips	25.000%		100.0000000%		100.0000000%	100.0000000%		100.0000000%
		TOTAL: STATE			100.0000000%			100.0000000%

		LEASE	OIL			GAS			
			P/A Tract Factor	Lessor's % of Lease	Lessor's % of P/A	P/A Tract Factor	Lessor's % of Lease	Lessor's % of P/A	
KENAI - STERLING ZONE									
STATE									
Union	50.000%	ADL-00588	---	---	--- 6.79113	6.7607000%	100.0000000%	6.7607000%	
Marathon	50.000%	ADL-00593	---	---	--- 7.47645	7.4430000%	100.0000000%	7.4430000%	
		ADL-00594	---	---	--- .67470	0.6717000%	100.0000000%	0.6717000%	
		ADL-02411	---	---	--- .76424	0.7608000%	100.0000000%	0.7608000%	
		ADL-308223	---	---	--- .91053	0.0083000%	100.0000000%	0.0083000%	
		ADL-324598	---	---	--- .00835	0.9058000%	100.0000000%	0.9058000%	
					16.6254	16.5503000%		~~16.5503000%~~	16.6254
FEDERAL									
Union	50.000%	02-028047	---	---	--- 10.3157	~~10.2695000%~~	60.91000 ~~60.9085000%~~	6.2549984%	6.2833
Marathon	50.000%	02-028055	---	---	--- 15.5145	~~15.4450000%~~	~~39.7763984%~~	6.1434647%	6.17166
		02-028056	---	---	--- 10.7157	~~10.6677000%~~	91.2749000%	9.7369325%	9.78019
		02-028103	---	---	--- .3035	~~0.3021000%~~	20.0256271%	0.0604974%	.06079
		02-028140	---	---	--- 5.6880	~~5.6625000%~~	92.8239000%	5.2561533%	5.27962
		02-028143	---	---	--- 5.9571	~~5.9304000%~~	~~96.7999000%~~ 96.79	5.7406213%	5.76586
					48.4945	~~48.2772000%~~		33.1926677%	33.34142
CIRI									
Union	50.000%	02-028047	---	---	--- 10.3157	~~10.2695000%~~	39.09 ~~39.0915000%~~	4.0145016%	4.03241
Marathon	50.000%	02-028055	---	---	--- 15.5145	~~15.4450000%~~	60.2236016%	9.3015353%	9.34282
		02-028056	---	---	--- 10.7157	~~10.6677000%~~	8.7251000%	0.9307675%	.93548
		02-028103	---	---	--- .3035	~~0.3021000%~~	79.9743729%	0.2416026%	.24272
		02-028140	---	---	--- 5.6880	~~5.6625000%~~	7.1761000%	0.4063467%	.40840
		02-028142	---	---	--- 19.4247	~~19.3377000%~~	100.0000000%	19.3377000%	19.42468
		02-028143	---	---	--- 5.9571	~~5.9304000%~~	3.2001000%	0.1897787%	.19122
		ADL-00460	---	---	--- 1.2140	~~1.2086000%~~	100.0000000%	1.2086000%	1.21404
		ADL-022330	---	---	--- 11.2215	~~11.1719000%~~	100.0000000%	11.1719000%	11.22155
					80.3547	~~79.9954000%~~		~~46.8027323%~~	47.01332
OTHER UNION & MARATHON LEASES									
Chevron		NA	---	---	--- 2.2365	2.6745000%	100.0000000%	2.6745000%	2.2365
Arco		NA	---	---	--- .39168	0.3899000%	100.0000000%	0.3899000%	.39168
		NA	---	---	--- .39168	0.3899000%	100.0000000%	0.3899000%	.39168
						~~3.4543000%~~ 3.01986		3.4543000%	3.01986
		TOTAL: STATE+FEDERAL+CIRI						96.5457000%	96.98014
		TOTAL: STATE+FEDERAL+CIRI+OTHER						100.0000000%	
KENAI - TYONEK ZONE									
FEDERAL									
Union	50.000%	02-028055	---	---	---	9.1255000%	39.7763984%	3.6298000%	
Marathon	50.000%								
CIRI									
Union	50.000%	02-028055	---	---	---	9.1255000%	60.2236016%	5.4957000%	
Marathon	50.000%	02-028142	---	---	---	81.7490000%	100.0000000%	81.7490000%	
		ADL-022330	---	---	---	9.1255000%	100.0000000%	9.1255000%	
						100.0000000%		96.3702000%	
		TOTAL: FEDERAL+CIRI						100.0000000%	
KENAI - UPPER TYONEK ZONE									
CIRI									
Union	50.000%	02-028142	---	---	---	100.0000000%	100.0000000%	100.0000000%	
Marathon	50.000%								
KENAI - BELUGA ZONE									
FEDERAL									
Union	50.000%	02-028055	---	---	---	10.4767000%	39.7763984%	4.1672500%	
Marathon	50.000%								
CIRI									
Union	50.000%	02-028055	---	---	---	10.4767000%	60.2236017%	6.3094500%	
Marathon	50.000%	02-028142	---	---	---	89.5233000%	100.0000000%	89.5233000%	
						100.0000000%		95.8327500%	
		TOTAL: FEDERAL+CIRI				100.0000000%		100.0000000%	

	LEASE	OIL P/A Tract Factor	OIL Lessor's % of Lease	OIL Lessor's % of P/A	GAS P/A Tract Factor	GAS Lessor's % of Lease	GAS Lessor's % of P/A
LEWIS RIVER UNIT							
STATE							
Group 1							
Cities Svc 81.000%	ADL-58798	---	---	---	100.0000000%	100.0000000%	100.0000000%
Pacific Lt 19.000%	ADL-58799	---	---	---	100.0000000%	100.0000000%	100.0000000%
	ADL-58800	---	---	---	100.0000000%	100.0000000%	100.0000000%
	ADL-58802	---	---	---	100.0000000%	100.0000000%	100.0000000%
	ADL-58803	---	---	---	100.0000000%	100.0000000%	100.0000000%
	ADL-58804	---	---	---	100.0000000%	100.0000000%	100.0000000%
	ADL-58805	---	---	---	100.0000000%	100.0000000%	100.0000000%
	ADL-58806	---	---	---	100.0000000%	100.0000000%	100.0000000%
					100.0000000%		100.0000000%
Group 2							
Cities Svc 15.000%	ADL-58801	---	---	---	100.0000000%	100.0000000%	100.0000000%
Pacific Lt 85.000%							
Group 3							
Pacific Lt 100.000%	ADL-75999	---	---	---	100.0000000%	100.0000000%	100.0000000%
	TOTAL: STATE						100.0000000%
MCARTHUR RIVER							
STATE							
West Foreland							
Union 49.000%	ADL-18730	43.4700000%	100.0000000%	43.4700000%	43.4700000%	100.0000000%	43.4700000%
Marathon 49.000%	ADL-17594	39.1300000%	100.0000000%	39.1300000%	39.1300000%	100.0000000%	39.1300000%
Arco 2.000%	ADL-18729	8.7000000%	100.0000000%	8.7000000%	8.7000000%	100.0000000%	8.7000000%
	ADL-18772	8.7000000%	100.0000000%	8.7000000%	8.7000000%	100.0000000%	8.7000000%
		100.0000000%		100.0000000%	100.0000000%		100.0000000%
Middle Kenai G							
Union 49.000%	ADL-17594	26.6700000%	100.0000000%	26.6700000%	26.6700000%	100.0000000%	26.6700000%
Marathon 49.000%	ADL-18730	32.5900000%	100.0000000%	32.5900000%	32.5900000%	100.0000000%	32.5900000%
Arco 2.000%	ADL-18729	34.8100000%	100.0000000%	34.8100000%	34.8100000%	100.0000000%	34.8100000%
	ADL-18772	5.9300000%	100.0000000%	5.9300000%	5.9300000%	100.0000000%	5.9300000%
		100.0000000%		100.0000000%	100.0000000%		100.0000000%
Hemlock							
Union 40.950%	ADL-17579	12.9480000%	100.0000000%	12.9480000%	12.9480000%	100.0000000%	12.9480000%
Arco 12.900%	ADL-17602	3.7000000%	100.0000000%	3.7000000%	3.7000000%	100.0000000%	3.7000000%
Marathon 40.950%	ADL-18758	2.7750000%	100.0000000%	2.7750000%	2.7750000%	100.0000000%	2.7750000%
Amoco 1.400%	ADL-18777	4.6010000%	100.0000000%	4.6010000%	4.6010000%	100.0000000%	4.6010000%
Phillips 1.400%	ADL-21068	0.9250000%	100.0000000%	0.9250000%	0.9250000%	100.0000000%	0.9250000%
Getty 1.400%	ADL-17594	28.6480000%	100.0000000%	28.6480000%	28.6480000%	100.0000000%	28.6480000%
Chevron 1.000%	ADL-18729	17.8330000%	100.0000000%	17.8330000%	17.8330000%	100.0000000%	17.8330000%
	ADL-18730	16.6480000%	100.0000000%	16.6480000%	16.6480000%	100.0000000%	16.6480000%
	ADL-18772	9.2490000%	100.0000000%	9.2490000%	9.2490000%	100.0000000%	9.2490000%
	ADL-18716	2.6730000%	100.0000000%	2.6730000%	2.6730000%	100.0000000%	2.6730000%
		100.0000000%		100.0000000%	100.0000000%		100.0000000%
Kenai G Zone, K-10							
Union 100.000%	ADL-18777	100.0000000%		100.0000000%	100.0000000%		100.0000000%
TOTAL: STATE				100.0000000%			100.0000000%
MIDDLE GROUND SHOAL							
STATE							
Group 1							
Amoco 25.000%	ADL-17595	26.5880000%	100.0000000%	26.5880000%	26.5880000%	100.0000000%	26.5880000%
Arco 12.500%							
Chevron 12.500%							
Getty 25.000%							
Phillips 25.000%							
Group 2							
Shell 33.330%	ADL-18754	45.2340000%	100.0000000%	45.2340000%	45.2340000%	100.0000000%	45.2340000%
Arco 33.330%	ADL-18756	28.1780000%	100.0000000%	28.1780000%	28.1780000%	100.0000000%	28.1780000%
Chevron 33.340%							
		73.4120000%		73.4120000%	73.4120000%		73.4120000%
	TOTAL: STATE			100.0000000%			100.0000000%

		Lease	Oil: P/A Tract Factor	Oil: Lessor's % of Lease	Oil: Lessor's % of P/A	Gas: P/A Tract Factor	Gas: Lessor's % of Lease	Gas: Lessor's % of P/A
NORTH COOK INLET								
STATE								
Phillips	100.000%	ADL-17589	---	---	---	44.7324000%	100.0000000%	44.7324000%
		ADL-17590	---	---	---	6.5430000%	100.0000000%	6.5430000%
		ADL-18740	---	---	---	8.1787000%	100.0000000%	8.1787000%
		ADL-18741	---	---	---	6.5430000%	100.0000000%	6.5430000%
		ADL-37831	---	---	---	34.0029000%	100.0000000%	34.0029000%
		TOTAL: STATE				100.0000000%		100.0000000%
NORTH TRADING BAY UNIT								
STATE								
Group 1								
Arco	100.000%	ADL-17597	50.0000000%	100.0000000%	50.0000000%	---	---	---
		ADL-18776	28.5700000%	100.0000000%	28.5700000%	---	---	---
			78.5700000%		78.5700000%			
Group 2								
Texaco	50.000%	ADL-34531	21.4300000%	100.0000000%	21.4300000%	---	---	---
Superior	50.000%							
		TOTAL: STATE			100.0000000%			
SOUTH MIDDLE GROUND SHOALS								
STATE								
Amoco	25.000%	ADL-18744	6.8965600%	100.0000000%	6.8965600%	---	---	---
Arco	12.500%	ADL-18746	93.1034400%	100.0000000%	93.1034400%	---	---	---
Chevron	12.500%							
Getty	25.000%	TOTAL: STATE	100.0000000%		100.0000000%			
Phillips	25.000%							
STERLING UNIT								
STATE								
Union	50.000%	ADL-324599	---	---	---	4.8484000%	100.0000000%	4.8484000%
Marathon	50.000%	ADL-324599	---	---	---	1.5990000%	100.0000000%	1.5990000%
		ADL-02497	---	---	---	3.6283000%	100.0000000%	3.6283000%
		ADL-320912	---	---	---	2.3612000%	100.0000000%	2.3612000%
						12.4369000%		12.4369000%
FEDERAL								
Union	50.000%	02-028063	---	---	---	47.6388000%	40.1451498%	19.1246676%
Marathon	50.000%	02-028135	---	---	---	30.5822000%	29.3066489%	8.9626180%
						78.2210000%		28.0872856%
CIRI								
Union	50.000%	02-028063	---	---	---	47.6388000%	59.8548502%	28.5141324%
Marathon	50.000%	02-028135	---	---	---	30.5822000%	70.6933511%	21.6195820%
		ADL-01836	---	---	---	2.6316000%	100.0000000%	2.6316000%
		ADL-51502	---	---	---	5.0463000%	100.0000000%	5.0463000%
		ADL-51502	---	---	---	1.6642000%	100.0000000%	1.6642000%
						87.5631000%		59.4758144%
		TOTAL: STATE+FEDERAL+CIRI						100.0000000%

		LEASE	OIL			GAS		
			P/A Tract Factor	Lessor's % of Lease	Lessor's % of P/A	P/A Tract Factor	Lessor's % of Lease	Lessor's % of P/A
SWANSON RIVER UNIT *								
FEDERAL								
Chevron	48.486%	002-028077	0.8614100%	100.0000000%	0.8614100%	0.8614100%	100.0000000%	0.8614100%
Arco	48.486%	002-028384	0.2907000%	100.0000000%	0.2907000%	0.2907000%	100.0000000%	0.2907000%
Union	1.514%	002-028396	0.0286637%	100.0000000%	0.0286637%	0.0286637%	100.0000000%	0.0286637%
Marathon	1.514%	002-028399	2.9888636%	100.0000000%	2.9888636%	2.9888636%	100.0000000%	2.9888636%
		002-028405	0.1710937%	100.0000000%	0.1710937%	0.1710937%	100.0000000%	0.1710937%
		002-028406	11.3919900%	100.0000000%	11.3919900%	11.3919900%	100.0000000%	11.3919900%
		002-028990	1.2663167%	100.0000000%	1.2663167%	1.2663167%	100.0000000%	1.2663167%
		002-028993	0.6648250%	100.0000000%	0.6648250%	0.6648250%	100.0000000%	0.6648250%
		002-028996	16.5466071%	100.0000000%	16.5466071%	16.5466071%	100.0000000%	16.5466071%
		002-028997	30.2338500%	100.0000000%	30.2338500%	30.2338500%	100.0000000%	30.2338500%
		002-029002	0.1693000%	100.0000000%	0.1693000%	0.1693000%	100.0000000%	0.1693000%
			64.6136198%		64.6136198%	64.6136198%		64.6136198%
CIRI								
Chevron	48.486%	002-028077	1.4878900%	100.0000000%	1.4878900%	1.4878900%	100.0000000%	1.4878900%
Arco	48.486%	002-028384	2.0349000%	100.0000000%	2.0349000%	2.0349000%	100.0000000%	2.0349000%
Union	1.514%	002-028396	0.5601363%	100.0000000%	0.5601363%	0.5601363%	100.0000000%	0.5601363%
Marathon	1.514%	002-028399	3.5866364%	100.0000000%	3.5866364%	3.5866364%	100.0000000%	3.5866364%
		002-028405	0.9239063%	100.0000000%	0.9239063%	0.9239063%	100.0000000%	0.9239063%
		002-028406	4.5038100%	100.0000000%	4.5038100%	4.5038100%	100.0000000%	4.5038100%
		002-028990	6.3315833%	100.0000000%	6.3315833%	6.3315833%	100.0000000%	6.3315833%
		002-028993	3.8939750%	100.0000000%	3.8939750%	3.8939750%	100.0000000%	3.8939750%
		002-028996	1.9855929%	100.0000000%	1.9855929%	1.9855929%	100.0000000%	1.9855929%
		002-028997	10.0779500%	100.0000000%	10.0779500%	10.0779500%	100.0000000%	10.0779500%
			35.3863802%		35.3863802%	35.3863802%		35.3863802%
		TOTAL: FEDERAL+CIRI			100.0000000%			100.0000000%

* Swanson River factors for LPG are identical to factors for oil and gas.

TRADING BAY FIELD								
STATE								
Well A-6								
Marathon	33.333%	ADL-18731	4.9955900%	100.0000000%	4.9955900%	5.0504100%	100.0000000%	5.0504100%
Union	33.333%							
Superior	16.667%							
Texaco	16.667%							
Well A-15								
Marathon	35.000%		2.3901000%	100.0000000%	2.3901000%	3.3406100%	100.0000000%	3.3406100%
Union	35.000%							
Superior	15.000%							
Texaco	15.000%							
Non-Pool								
Marathon	50.000%		92.6143100%	100.0000000%	92.6143100%	91.6089800%	100.0000000%	91.6089800%
Union	50.000%							
TOTAL: STATE					100.0000000%			100.0000000%
WEST FORK UNIT								
FEDERAL								
Enstar	100.000%	002-028988A	---	---	---	100.0000000%	100.0000000%	100.0000000%

S/D87;APXA_3;11/26/86

APPENDIX B
DEMAND PROJECTION
METHODOLOGY AND ASSUMPTIONS

APPENDIX B
DEMAND PROJECTION
METHODOLOGY AND ASSUMPTIONS

Introduction

Demand for oil and gas is best calculated by dividing total demand into use categories. Because the factors affecting the level and growth rate of demand by use are similar and the fact that oil and gas often compete with one another in a market for a particular use such as for space heating or electricity generation, demand may otherwise be distorted. The use categories in this study are transportation, electricity, space heat (including cooking, water heating, and clothes drying), and industrial. A simple model called ENDMOD (ENergy Demand MODel) has been constructed for calculating future energy demands in Alaska.

The factors most important in projecting future demand will vary by use category. In general, the most important are population (or households) and relative fuel prices. The household is the basic consuming unit for the residential sector and is a good proxy for demand in the commercial sector. In the industrial sector, relative fuel prices are the primary demand determinate. In the residential and commercial sectors, fuel prices are more important in determining the type of fuel used.

Transportation Use of Liquid Petroleum

INTRODUCTION

Projecting transportation fuel use requires the use of per capita consumption coefficients.

GASOLINE

a. Highway use (taxable and exempt) is the largest category of gasoline consumption in Alaska. Demand is related to population, personal income, and the fuel efficiency of the automobile stock. Growth in the first two factors will tend to offset the effect of increased fuel efficiency in future years resulting in relatively constant use of this fuel. (In Alaska, per capita consumption of highway gas peaked in 1975 at 502 gallons per capita and declined to 383 gallons per capita in 1983.)

b. Aviation gasoline (taxable and exempt) use has, in the past decade, been roughly 10 percent as large as highway gasoline use. Between 1971 and 1982, consumption of aviation gas per capita varied between 35 and 43 gallons. In 1982, consumption fell to 36 gallons from the peak of 43 gallons in 1981 and to 30 gallons per capita in 1983. Consumption increased in 1984 to an estimated 33 gallons per capita. The initial value for aviation gas consumption is the 4-year mean of 35 gallons per capita.

c. Marine gasoline (taxable and exempt) use has, in the past decade, been roughly 50 percent of the aviation gasoline consumption level with an apparently slightly slower growth rate and strong year-to-year fluctuation. We assume a strong income elasticity of demand will result in maintenance of the current per-capita-use coefficient in future years. Consumption in 1983 was 17 gallons per capita. The initial value used to project consumption is the 4-year mean of 17.5 gallons per capita.

JET FUEL

Jet fuel consumption consists of domestic commercial operations, international commercial operations, and military operations. Domestic commercial operations are a function of the Alaskan population and economy and, as such, have grown rapidly in per capita terms historically (taxable). International commercial operations are a function of world economic and political conditions as well as aviation technology. Military operations are broadly a function, albeit a different one, of the same factors. These two latter categories cannot be separately identified in the historical data, but their combined total has shown relatively modest, although cyclical, growth since the early 1970s.

We project domestic commercial consumption separately from international commercial and military use. We assume that the taxable jet fuel category is primarily domestic commercial consumption and that the exempt jet fuel category includes international commercial and military consumption. The coefficient relating consumption to population for domestic commercial aviation has increased from 153 gallons per capita in 1971 to 350 in 1981 and 575 in 1984.

We assume future growth will exceed population but at a slower rate than it has historically because of increased efficiency of the capital stock.

International commercial and military consumption of jet fuel is the only category of fuel consumption not projected on a per capita basis. While international commercial and military consumption is historically variable and, therefore, difficult to project, growth during the preceding decade approximated 1 percent per annum. We use this figure to project future growth with 1984 consumption of 260 million gallons as the initial value.

DIESEL

The categories used to report diesel fuel sales in Department of Revenue tax records have changed at least twice since 1979, making use of this source of data for projecting highway diesel consumption (or any type of consumption) difficult.

Future growth in consumption of highway diesel is projected at the per capita use rate of 565 gallons even though the per capita consumption of highway diesel fuel has grown steadily since 1978, when it reached a post-pipeline construction low. While the most recent reporting system provides a breakout of nontransportation sales in the "exempt other diesel" category, the estimates of highway diesel for earlier years

Heat rates are projected to remain at current levels.

SOUTHEAST

a. Consumption of Electricity Per Capita

The growth rate in consumption per capita in Southeast is assumed to be the same rate as in the railbelt. These growth rates are applied to 1983 per capita consumption of 8,000 kwh per capita. The advent of less expensive electricity provided by hydroelectric power may cause electric space heating demand to grow and accelerate that growth rate. We assume this effect is insignificant.

b. Generation Mode Split

As recently completed hydroelectric projects are brought on line, they will back out the use of fuel oil in electricity generation in those locations linked to the hydropower. The proportion of total regional electricity consumption in these communities is estimated using the proportion of Southeast Alaska electricity consumption used by these communities in 1983.

REST-OF-STATE

Growth in per capita electricity demand in the rest of the state is assumed to occur at twice the rate projected for the railbelt. These growth rates are applied to 1983 per capita consumption rates of 3,900 kwh per capita.

With the exception of Barrow, this region currently relies on fuel oil for electricity generation. This dependence is projected to continue into the future with the exception of Kodiak, which now receives hydropower available from the Terror Lake project.

Space Heating Use of Liquid Fuels and Natural Gas[1]

INTRODUCTION

In the Anchorage area, natural gas is the most economical fuel for space heating. Elsewhere, fuel oil is the least expensive alternative except where electricity generated by natural gas is available. In projecting future demands, we use different procedures for gas and fuel oil because of differences in data availability. Natural gas use is based upon a projection of the current level of consumption. Fuel oil demand is estimated based upon the proportion of the population assumed to heat with fuel oil and estimates of mean household fuel oil consumption. This approach is necessary because there is no reliable direct estimate of current fuel oil consumption for space heating.

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[1]Includes water heating, cooking, and other minor uses.

RAILBELT

Natural gas for space heating (and a small amount of related uses for gas purchased from utilities) is projected to grow as a function of population. Growth has historically occurred at a rate in excess of population due to gas retrofiting and expansion of the commercial sector. This trend will moderate in the future, and growth is projected to exceed population by two percent annually.

In addition, a new gas market has opened in the Matanuska Valley. We estimate that by 1995, one-half of the building stock in the Matanuska Valley will utilize natural gas for space heating. The proportion of railbelt population heating with gas is 47 percent. This factor forms the basis for estimating the growth of space heating demand for natural gas in the Matanuska Valley. The resulting demand level is estimated on a per household basis for residential consumption and a per capita basis for commercial consumption. Residential natural gas consumption is approximately 200 thousand cubic feet per household. Per capita commercial consumption is 55 thousand cubic feet.

Fuel oil use for space heating is generally preferred only where gas or gas-fired electricity is not available. Growth in its use will depend upon the location of new structures in the railbelt. We assume that the proportion of households using fuel oil for space heat declines slightly from the current share of 24 percent to 22.4 percent in 1999. Per-household residential and per-capita commercial fuel oil consumption are based on gas consumption figures converted to fuel oil on the basis of BTU equivalency.

NONRAILBELT

Outside the railbelt, space heating is almost entirely provided by fuel oil, with the exception of Barrow. Fuel oil consumption is calculated using the share of households with fuel oil space heat

and the same per capita coefficient of fuel oil use for space heating as applied to the railbelt population. This estimate is consistent with surveys and small regional studies of fuel oil use in rural Alaska. This estimate entails compensating errors. On the one hand, the heating degree days are greater in most parts of the state which rely on fuel oil relative to Anchorage. On the other hand, the size of structures is smaller outside Anchorage.

For natural gas consumption in Barrow, a growth rate which exceeds population growth by 2 percent is applied to a base of current consumption.

<u>Industrial Use of Liquid Fuels and Natural Gas</u>

Industrial consumption is not a function of population, but rather of the availability of supplies and market opportunities. Since the major industrial users of petroleum fuels are small in number, they are best projected on a case-by-case basis.

AMMONIA-UREA PRODUCTION

Ammonia-urea production using natural gas is assumed to continue at a constant level.

PETROLEUM PRODUCTION-RELATED USE

a. Gas Use in Production

Natural gas is utilized in petroleum production in Cook Inlet and on the North Slope for a variety of purposes, including space heating, electricity generation, pump fuel, etc. The level of consumption is difficult to project because of its many uses, but it is primarily dependent upon petroleum production levels and petroleum employment levels. We assume the level remains constant in Cook Inlet. On the North Slope, it grows for seven years and is constant thereafter.

b. Oil Use in Production

A small quantity of fuel oil is used in oil production. This is included in the miscellaneous industrial category.

c. Gas Use in Transportation

Assumed to remain constant.

d. Oil Use in Transportation

Fuel oil fuels the pumps for most of the Alyeska pipeline. Annual consumption is estimated to be two million barrels of oil. This level is projected to remain constant.

OIL--MISCELLANEOUS

Some fuel oil is used in electricity generation for industrial self-supplied power. Data on the consumption comes from the Alaska Power Administration, and it is projected to remain constant.

MILITARY

The military uses natural gas for electricity generation and space heating in the Anchorage area and fuel oil elsewhere. Military transportation use of fuel oil is counted in the transportation sector. Military natural gas use is projected to remain constant. Lack of data prevents the calculation of military fuel oil consumption for space heating.

INJECTION

Gas is injected into petroleum reservoirs to enhance oil recovery. Because this is only a temporary use of gas, it is not counted a part of final consumption.

LNG

Liquified Natural Gas (LNG) is defined as export of gas for the purposes of this report.

Economic Growth Assumptions

Economic projections for estimating future petroleum demands are lower this year because of the decline in the world price of oil. This makes it difficult to project activity in the petroleum industry, the most important basic sector industry in the economy, and activity generated by state government spending, which is primarily a function of the availability of petroleum revenues. It also makes the task of relating recent growth to longer-term trends difficult.

The economic growth during the last five years, fueled by the dramatic growth in state spending resulting from the increase in oil prices, has generated an increase in population from 420,000 in 1980 to an estimated 535,000 in 1985. This increase in population exceeds the magnitude of the growth which occurred between 1974 and 1976 during the peak construction years for the oil pipeline (approximately 67,000) and was unanticipated by all forecasts. The annual growth rate of 5.8 percent since 1980 is double the average annual growth rate of 2.9 percent in population between 1960 and 1980. It is difficult to estimate the extent of population contraction in response to the fall in the price of oil.

The base case economic projection used in this analysis produces a population decline from 536,000 in 1985 to 523,000 in 1990, growing to 534,000 in 2000.

This growth is consistent with many possible sets of assumptions about future basic sector activity and public sector spending as well as support sector and demographic responses. The assumptions underlying this case are presented as Case I below.

The regional distribution of economic activity, employment, and population continues the historical trend of shifting gradually toward the railbelt as the economic center of the state.

The sensitivity case assumes more rapid economic growth and higher oil prices. It is described below as Case II.

1986 OIL AND GAS DEMAND STUDY
SUMMARY OF MAP MODEL ASSUMPTIONS: CASE I [OG86.3]

A. PETROLEUM REVENUE ASSUMPTIONS: DOR SEPT 1986 (S86.N3)
B. FISCAL ASSUMPTIONS: PERMANENT FUND EARNINGS USED, INCOME TAX IN, DIVIDEND OUT
C. INDUSTRY ASSUMPTIONS: MODERATE GROWTH (S86.N3)
D. NATIONAL VARIABLE ASSUMPTIONS: MODERATE GROWTH

	DESCRIPTION(a)
A. PETROLEUM REVENUE ASSUMPTIONS	
1. Severance Taxes	Based on 50 percent probability projections published by the Alaska Department of Revenue. The world oil price is assumed to average $12.85 in 1987. In 1986 dollars, the price trends slowly upward from $12.49 in 1987 to $15.98 in 2000. After 2000, revenues remain constant in nominal dollars (DORS6.50). No change in tax regulations. Partial TAPS settlement revenues included [RPTS].
2. Royalties	Based on 50 percent probability projections published by the Alaska Department of Revenue. After 2000, revenues remain constant in nominal dollars (DORS6.50) [RPRY].
3. Bonuses	Alaska receives $500 million over the period FY 1989 to 1992 in settlement of disputed offshore leases in Beaufort Sea [RPBS].
4. Property Taxes	Based on projections published by Alaska Department of Revenue, Revenue Sources (DORS6.50) augmented by taxes on onshore facilities related to OCS development (OCS.CM3Z -3) [RPPS].
5. Petroleum Corporate Income Tax	Based on projections published by Alaska Department of Revenue, Revenue Sources (DORS6.50). No change in tax regulations [RTCSPX].

(a) Codes in parentheses indicate ISER names for MAP Model SCEN_ case files, and codes in brackets indicate MAP variable names.

6. Rents	Increasing slowly from current level of $8 million [RPEN].
7. Miscellaneous Petroleum Revenues	Zero [RP9X].
8. Federal-State Petroleum-Related Shared Revenues	Increasing $1 million annually from current level of $25 million [RSFDNPX].
9. Windfalls	During FY 1986 the Permanent Fund experiences a capital gain of $1 billion. During FY 1987, $250 million accrues to Alaska from a litigation settlement with ARCO, $450 million in settlement of the TAPS tariff dispute, and $50 million from past federal revenue sharing.

B. FISCAL ASSUMPTIONS

1. State Appropriations	If funds available, ceiling established by Constitutional Spending Limit; otherwise appropriations equal revenues plus 70 percent [EXWIND] of general fund balance available for appropriations.
2. Capital/Operations Split	Two-thirds operations if Spending Limit in effect; 85 percent operations otherwise [EXSPLITX].
3. General Obligation Bonds	Bonding occurs up to point where debt service is 5 percent of state revenues.
4. Federal Grants-in-Aid for Capital Expenditures	Constant at $75 million [RSFDNCAX].
5. State Loan Programs	New capitalization terminated after FY 1987 [EXKTR1X]. Programs continue functioning on existing capitalization including AHFC [EXLOAN2] and APA revenue bond expenditures [EXCPSR1].
6. Municipal Capital Grants	Funding terminated after FY 1987 [RLTMCAP].
7. State-Local Revenue Sharing	Continuation proportional to total state expenditures [RLTRS].
8. State-Local Municipal Assistance	Continuation proportional to total state expenditures [RLTMA].

9. Permanent Fund/Other Appropriations in Excess of Spending Limit	None for operations [EXGFOPSX]; none for capital [EXSPCAP].
10. Permanent Fund Dividend	Eliminated after FY 1988 distribution [EXPFDIST].
11. Use of Permanent Fund Earnings	Half of the earnings allocated to the general fund beginning in FY 1988, rising to 100 percent of earnings by 1993 [EXPFTOGF].
12. Permanent Fund Principal	Continuous accumulation but inflation-proofing eliminated in 1993.
13. Personal Income Tax	Reimposed FY 1988.
14. Miscellaneous Local Revenue Sources	Miscellaneous state-local transfers [RLTX], large project property taxes [RLPTX], petroleum-related federal transfers [RLTFPX] all set to zero.
15. New Federal-State Shared Revenues	Zero [RSFDNX].
16. Large Project Corporate Income Taxes	Zero [RTCSX].
17. State-Local Wage Rates	Constant real wage rate beginning in 1988.

C. INDUSTRY ASSUMPTIONS

1. Trans-Alaska Pipeline	Operating employment remains constant at 885 through 2010 (TAP.S86).
2. North Slope Petroleum Production	Petroleum employment declines through the early 1990s from 4.7 thousand to 2 thousand in 1992, which is the subsequent stable level. Construction employment maintains a stable level of 1 thousand. This case presumes the oil price trend makes further development economically unfeasible (NSO.860G).
3. Upper Cook Inlet Petroleum Production	Employment in exploration and development of oil and gas in the Upper Cook Inlet area declines gradually beginning in 1983 by approximately 2.5 percent per year (UPC.S86).

4. OCS Development	Employment in exploration and development activity stops due to the low price of oil (OCS.CM3Z -3).
5. Oil Industry Headquarters	Oil company headquarters employment in Anchorage gradually declines from 4.4 thousand in 1985 to .9 thousand in 2000 to .3 thousand in 2010 (OHQ.F84W).
6. Healy Coal Mining	Export of approximately 1 million tons of coal annually will add 25 new workers to current base of 100 by 1986 (HCL.84X).
7. U.S. Borax	The U.S. Borax mine near Ketchikan is brought into production with operating employment of 790 beginning in 1989 and eventually increasing to 1,020 (BXM.F84).
8. Greens Creek Mine	Production from the Greens Creek Mine on Admiralty Island results in employment of 150 people from 1988 through 2003 (GCM.F84).
9. Red Dog Mine	The Red Dog Mine in the Western Brooks Range reaches full production with operating employment of 428 by 1993 (RED.F84).
10. Other Mining Activity	Mining employment not included in special projects increases from current level at 1 percent annually (OMN.S86).
11. Agriculture	Reduction in state support results in constant employment in agriculture (AGR.S86).
12. Logging and Sawmills	Logging for export by Native corporations expands employment to over 3,200 by 1995 before declining gradually to about 2,800 after 2005 (FLL.S86).
13. Pulp Mills	Employment declines at a rate of 1 percent per year after 1991 from the already depressed level of 600 (FPU.S86).

1986 OIL AND GAS DEMAND STUDY

SUMMARY OF MAP MODEL ASSUMPTIONS: CASE II [OG86.2]

A. PETROLEUM REVENUE ASSUMPTIONS: DOR MARCH 1986 (S86.N2)
B. FISCAL ASSUMPTIONS: PERMANENT FUND EARNINGS USED, INCOME TAX IN, DIVIDEND OUT
C. INDUSTRY ASSUMPTIONS: RAPID GROWTH (S86.N2)
D. NATIONAL VARIABLE ASSUMPTIONS: MODERATE GROWTH

	DESCRIPTION(a)
A. PETROLEUM REVENUE ASSUMPTIONS	
1. Severance Taxes	Based on March 1986 70 percent probability projections published by the Alaska Department of Revenue. In 1985 dollars, the price of oil rises slowly from $21 in 1988 to $23 in 2001. After 2002, revenues remain constant in nominal dollars (DOR.M6.7). No change in tax regulations. Partial TAPS settlement revenues included [RPTS].
2. Royalties	Based on March 1986 70 percent probability projections published by the Alaska Department of Revenue. After 2002, revenues remain constant in nominal dollars (DOR.M6.7) [RPRY].
3. Bonuses	Alaska receives $500 million over the period FY 1989 to 1992 in settlement of disputed offshore leases in Beaufort Sea [RPBS].
4. Property Taxes	Based on projections published by Alaska Department of Revenue, Revenue Sources (DOR.M6.7) augmented by taxes on onshore facilities related to OCS development (OCS.CM3Z -3) [RPPS].
5. Petroleum Corporate Income Tax	Based on projections published by Alaska Department of Revenue, Revenue Sources (DOR.M6.7). No change in tax regulations [RTCSPX].

(a) Codes in parentheses indicate ISER names for MAP Model SCEN_ case files, and codes in brackets indicate MAP variable names.

6. Rents	Increasing slowly from current level of $8 million [RPEN].
7. Miscellaneous Petroleum Revenues	Zero [RP9X].
8. Federal-State Petroleum-Related Shared Revenues	Increasing $1 million annually from current level of $25 million [RSFDNPX].
9. Windfalls	During FY 1986 the Permanent Fund experiences a capital gain of $1 billion. During FY 1987, $250 million accrues to Alaska from a litigation settlement with ARCO, $450 million in settlement of the TAPS tariff dispute, and $50 million from past federal revenue sharing.

B. FISCAL ASSUMPTIONS

1. State Appropriations	If funds available, ceiling established by Constitutional Spending Limit; otherwise appropriations equal revenues plus 70 percent [EXWIND] of general fund balance available for appropriations.
2. Capital/Operations Split	Two-thirds operations if Spending Limit in effect; 85 percent operations otherwise [EXSPLITX].
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5. State Loan Programs	New capitalization terminated after FY 1987 [EXKTR1X]. Programs continue functioning on existing capitalization including AHFC [EXLOAN2] and APA revenue bond expenditures [EXCPSR1].
6. Municipal Capital Grants	Funding terminated after FY 1987 [RLTMCAP].
7. State-Local Revenue Sharing	Continuation proportional to total state expenditures [RLTRS].
8. State-Local Municipal Assistance	Continuation proportional to total state expenditures [RLTMA].

9. Permanent Fund/Other Appropriations in Excess of Spending Limit	None for operations [EXGFOPSX]; none for capital [EXSPCAP].
10. Permanent Fund Dividend	Eliminated after FY 1992 distribution [EXPFDIST].
11. Use of Permanent Fund Earnings	Half of the earnings allocated to the general fund beginning in FY 1993, rising to 100 percent of earnings by 1999 [EXPFTOGF].
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13. Personal Income Tax	Reimposed FY 1988.
14. Miscellaneous Local Revenue Sources	Miscellaneous state-local transfers [RLTX], large project property taxes [RLPTX], petroleum-related federal transfers [RLTFPX] all set to zero.
15. New Federal-State Shared Revenues	Zero [RSFDNX].
16. Large Project Corporate Income Taxes	Zero [RTCSX].
17. State-Local Wage Rates	Constant real wage rate beginning in 1988.

C. INDUSTRY ASSUMPTIONS

1. Trans-Alaska Pipeline	Operating employment remains constant at 885 through 2010 (TAP.S86).
2. North Slope Petroleum Production	Petroleum employment increases through the early 1990s to a peak of 4.6 thousand and subsequently tapers off gradually. Construction employment grows in the 1990s to 1.000 thousand (NSO.86S).
3. Upper Cook Inlet Petroleum Production	Employment in exploration and development of oil and gas in the Upper Cook Inlet area declines gradually beginning in 1983 by approximately 2.5 percent per year (UPC.S86).

4. OCS Development	Employment in exploration and development activity stops due to the low price of oil (OCS.CM3Z -3).
5. Oil Industry Headquarters	Oil company headquarters employment in Anchorage remains at around 3,900 through 2010 (OHQ.S86).
6. Beluga Chuitna Coal Production	Development of 4.4 million ton/year mine for export beginning in 1986 provides total employment of 524 (BCL.04T(-0)).
7. Healy Coal Mining	Export of approximately 1 million tons of coal annually will add 25 new workers to current base of 100 by 1986 (HCL.84X).
8. U.S. Borax	The U.S. Borax mine near Ketchikan is brought into production with operating employment of 790 beginning in 1989 and eventually increasing to 1,020 (BXM.F84).
9. Greens Creek Mine	Production from the Greens Creek Mine on Admiralty Island results in employment of 150 people from 1988 through 2003 (GCM.F84).
10. Red Dog Mine	The Red Dog Mine in the Western Brooks Range reaches full production with operating employment of 428 by 1993 (RED.F84).
11. Other Mining Activity	Mining employment not included in special projects increases from current level at 1 percent annually (OMN.S86).
12. Agriculture	Reduction in state support results in constant employment in agriculture (AGR.S86).
13. Logging and Sawmills	Logging for export by Native corporations expands employment to over 3,200 by 1995 before declining gradually to about 2,800 after 2005 (FLL.S86).

14. Pulp Mills	Employment declines at a rate of 1 percent per year after 1991 from the already depressed level of 600 (FPU.S86).
15. Commercial Fishing--Nonbottomfish	Employment levels in traditional fisheries harvest remain constant at 7,500 through 2010 (TCF.S86).
16. Commercial Fish Processing--Nonbottomfish	Employment in processing traditional fisheries harvests remains at the level of the average figure for the period 1982-1984, or around 6,500 (TFP.S86).
17. Commercial Fishing--Bottomfish	The total U.S. bottomfish catch expands at a constant rate to allowable catch in 2000, with Alaska resident harvesting employment rising to 1.033 thousand. Onshore processing capacity expands in the Aleutians and Kodiak census divisions to provide total resident employment of 1.471 thousand by 2000 (BCF.S86).
18. Federal Military Employment	Employment declines at 1 percent per year, consistent with the long-term trend since 1960 (GFM.S86).
19. Light Army Division Deployment	A portion of a new Army division is deployed to Fairbanks and Anchorage beginning in 1986, augmenting active-duty personnel by 3,700 by 1988 (GFM.L86)
20. Federal Civilian Employment	After declining by 1 percent per year from 1986 to 1990, employment rises at 0.5 percent annual rate consistent with the long-term trend since 1960 (GFC.S86).
21. Tourism	Number of visitors to Alaska increases by 30,000 per year to over 1.3 million by 2010 (TRS.J85).
22. State Hydroelectric Projects	Construction employment from Alaska Power Authority projects peaks at over 700 in 1990 for construction of several projects in Southcentral and Southeast Alaska, including Bradley Lake and Chakachamna (SHP.F85), (SHP.C86), and (SHP.B86).

23. Kenai Peninsula LNG

A 400-mmcf liquefaction plant, 300-mile pipeline gathering system, and loading dock are constructed on the Kenai Peninsula in the late 1990s. Construction employment covers 4 years beginning in 1997 at 146 and peaking in 1999 at 1,300. Operations employment of 100 begins in 2001 (PAL.EIS -15).

24. TAGS Pipeline

A pipeline to transport North Slope natural gas to market in Japan is constructed between 2000 and 2008. The line extends from Prudhoe Bay to Kenai and includes compression stations, conditioning facilities, and a liquefaction plant. Construction employment is 890 in the initial year, rises to a peak of 4,782 in 2003, and falls to 3,692 in 2008. Operations employment rises from 236 in 2005 to 435 in 2010. Construction and operations employment occurs all along the pipeline corridor. On the Kenai Peninsula, employment begins at 73 in 2000, rises to 2,673 in 2003, and is 200 in the operations phase (TAG.HIC 0).

D. NATIONAL VARIABLE ASSUMPTIONS

1. U.S. Inflation Rate

Consumer prices rise at an annual rate of approximately 4 percent in the late 1980s, increasing gradually to approximately 5.6 percent annually after 2000. This assumption is consistent with DOR revenues.

2. Real Average Weekly Earnings

Growth in real average weekly earnings averages 1 percent annually.

3. Real Per Capita Income

Growth in real per capita income averages 1.5 percent annually.

4. Unemployment Rate

Long-run rate of 7 percent.

APPENDIX C
CRUDE OIL ANALYSES

APPENDIX D
CONVERSION FACTORS

Conversion Factors:

1 gallon diesel =0.0239 barrel crude oil equivalent
1 gallon gasoline =0.0215 barrel crude oil equivalent
1 gallon jet fuel =0.023 barrel crude oil equivalent

1 gallon crude oil =0.1387 million BTU
1 MCF natural Gas =1.000 million BTU
1 barrel diesel =5.825 million BTU
1 barrel gasoline =5.248 million BTU
1 barrel jet fuel =5.604 million BTU

APPENDIX E
DEFINITIONS OF STATUTORY TERMS

DEFINITIONS OF STATUTORY TERMS

AS 38.05.183 states that oil and gas taken in kind as the state's royalty share of production may not be sold or otherwise disposed of for export from the state until the Commissioner of Natural Resources determines that the royalty-in-kind oil or gas is surplus to the present and projected intrastate domestic and industrial needs for oil and gas.

The statute contains several key terms whose meaning must be resolved before an estimate can be made of oil and gas surplus to the state's needs. These key terms are: 1) "oil and gas," 2) "export," 3) "present," 4) "projected," 5) "domestic," 6) "industrial," 7) "intrastate," and 8) "how these needs are to be met." Each key term affects the size of the estimated demand for oil and gas in Alaska and consequently, the size of the projected surplus or deficit. The meaning of each term is discussed below.

Oil and Gas

Crude oil and natural gas are fluids containing hydrocarbon compounds produced from naturally occurring petroleum deposits. Typical crude oil contains several hundred chemical compounds. The lightest of these are gases at normal temperatures and pressure, described as "natural gas." These light fractions of the crude oil stream include both hydrocarbon and non-hydrocarbon gases, such as water, carbon dioxide, hydrogen sulfide, helium, or nitrogen. The principal hydrocarbons are methane (CH_4), ethane (C_2H_6), propane (C_3H_8), butanes (C_4H_{10}), and pentanes (C_5H_{12}). The gaseous component found most often and in largest volumes is, typically, methane. Heavier fractions of the crude stream are usually liquids. If a given hydrocarbon fraction is gaseous at reservoir temperatures and pressures, but is recoverable by condensation (cooling and pressure reduction), absorption, or other means, it is classified by the American Gas Association (AGA) as a natural gas liquid (NGL).[1] Natural gas liquids include ethane if ethane is recovered from the gas stream as a liquid. A related term is liquefied petroleum gas (LPG), composed of hydrocarbons which liquefy under moderate pressure under normal temperatures. LPG usually refers to propane and butane. A second related term is condensate, which refers to LPG plus heavier NGL component (natural gasoline). The lightest hydrocarbon fraction is methane, which is almost never recovered as a liquid, and which makes up the bulk of pipeline gas. If a natural gas stream contains few hydrocarbons which are commercially recoverable as liquids, it is considered "dry gas" or "lean gas." The distinction between "wet" and "dry" is usually a legal one, which varies from state to state. "Crude oil" usually means the non-gaseous portion of the crude oil stream.

Natural gas may occur in reservoirs which are predominately gas-bearing or in reservoirs in which the gas is in contact with petroleum liquids. Non-associated gas is natural gas from a reservoir where the gas is neither in contact with nor dissolved in crude oil. Associated gas occurs in contact

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[1]Definitions vary with processes.

with crude oil, but is not dissolved in it. A gas cap on a crude oil reservoir is a typical example of associated gas. Dissolved gas is dissolved in petroleum liquids and is produced along with them. Dissolved and associated gases are usually good sources of NGL while non-associated gases are often "dry."

The distinction between natural gas and its NGL components is important to a study of the supply and demand of royalty oil and gas because natural gas liquids have a multitude of uses when separated from the gas stream. For example, propane is both produced in Alaska and sold in Alaska as bottled gas for residential, commercial, and limited transportation uses, while butane is used for blending in gasoline and military jet fuel and as a refinery fuel. In addition, Marathon Oil uses LPG to enrich crude oil at its Trading Bay facility. It ships the combined fluids to the Drift River terminal for export.[2] Potential uses for NGL also include the enriching ("spiking") of pipeline gas and crop drying. Several years ago the Dow-Shell Petrochemical Group and Exxon studied the feasibility of utilizing the NGL contained in Prudhoe Bay natural gas as the basis for an Alaska petrochemicals industry. Since the State has the option of considering NGL separately from the gas stream, two definitions of natural gas consumption and reserves are possible. One of these would consider natural gas liquids as part of the gas stream. The second definition would treat the markets for LPG and ethane separately from those for gas. This requires a separate estimate of LPG consumption and gas liquids reserves. In this report, demand for LPG and ethane is estimated separately from that for gas; however, no separate estimate is made of gas liquids reserves.

Export

Taken in context, this term appears to mean the direct physical sending of oil and gas out of the state. However, when one considers the fact that much of Alaska's industrial use of oil and gas is processed directly for export markets, the meaning of export versus "intrastate" is not so obvious. For example, it appears that processing of gas into another product, e.g., anhydrous ammonia, would probably be an "industrial" use rather than "export" of gas, even though the ammonia is mostly exported. Liquefication to change the phase of the gas is a less obvious case. The liquefication of natural gas is considered a transportation process in this report. Still more troublesome is the use of gas and oil for transportation related to export. Is the gas and oil consumed in TAPS pipeline pump stations, for example, an "industrial" use in state? Or is it really "export" of that energy, since it is consumed in the exporting process? There is no reason why the State may not be approached in the future to commit royalty oil and gas to quasi-export uses. Indeed, a top dollar offer was made by the ALPETCO (later, Alaska Oil Company) for royalty oil ultimately destined (as petrochemical products) for out-of-state markets. Though the offer was made, payments in full were not made. Also, the state once committed royalty gas to the El Paso gas pipeline proposal for export of Prudhoe Bay gas, which involved liquefication. Neither

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[2] Kramer, L., Williams, B., Erickson, G., In-State Use Study for Propane and Butane. Prepared for the Alaska Department of Natural Resources. Kramer Associates, Juneau, October 1981.

proposal was clearly for in-state industrial use. In this report, industrial demand is treated with multiple definitions as outlined later in the chapter to show how different definitions of "export" affect the estimate of total consumption in Alaska.

Present

The problem here is that the term "present" may mean "latest year" consumption, "average recent year" consumption, "weather-adjusted" consumption, or "worst case" consumption. In the residential and commercial sector particularly, each definition gives a somewhat different answer because of the variability of weather.

The "worst case" consumption calculation can result in considerably higher gas consumption than the most recent year, if the most recent year happens to have been a relatively warm one. While it is not correct forecasting procedure to make long run forecasts of intrastate residential consumption of natural gas which assume worst case forecasts for every year, it may be prudent in practice to reserve part of the the State's gas and oil supply for bad weather. For forecasting, variability of weather makes the picking of a starting value for consumption somewhat tricky. In this report, Rail Belt consumption is based on average weather years. For the remainder of the state, trended per capita consumption is used, which approximates average weather conditions.

Projected

This is a very difficult concept, since many different projections of consumption would be possible even if it were possible to agree on a single concept defining consumption. Rates of economic development, population growth, and relative energy prices are key features of any consumption forecast, but assumptions concerning any of these variables are necessarily controversial. This report describes a range of possible consumption figures under precisely articulated definitions of consumption and varying paces of economic, population, and fuel price growth. The economic and population forecasts used in this report were done by the University of Alaska Institute of Social and Economic Research in December, 1984. The assumptions used to run their economic model are shown in Appendix B.

Domestic

Domestic consumption appears to mean Alaska residential consumption. As we saw above under the subheading "present", it is not at all obvious which definition of domestic consumption is the most appropriate, even when the identity of the customer is not in dispute. Some multifamily residential use may be described as "commercial", obscuring the definition of the customer and causing forecasting problems for natural gas. The definition of "domestic" considered in this report includes multifamily residential in "residential" or "domestic" use.

Industrial

As described above, "industrial" energy use has a number of potential definitions. Since one intent of giving in-state industrial needs priority over export uses of royalty oil and gas seems to be encourage in-state economic activity, [3] a day-to-day working definition of this industrial priority is that the royalty reserves be committed to the market which has the largest potential economic impact in Alaska. For forecasting purposes, however, it is difficult to say which markets will prove to be of the most economic benefit to the state. As a compromise, we will adopt four alternative definitions of "industrial" in this study.

The four alternative definitions of industrial use of oil and gas used in this report are outlined below, beginning with the most restrictive and moving to the most liberal.

Definition 1: Industrial use consists of any consumption of natural gas, petroleum, or their products in combustion (except that required to export oil or gas); or the chemical transformation of natural gas, petroleum, or their products into refined products for local markets. This definition explicitly excludes the exported products from refineries, as well as uses which merely change the physical form of the product (gas conditioning or liquefaction) for export, or which move the product to an export market (pipeline fuel, fuel used on lease, shrinkage, injection, vented and flared gas).

Definition 2: Industrial use consists of ;any consumption of natural gas, petroleum, or their products in combustion (except in oil and gas production and transportation); or the chemical transformation of natural gas, petroleum, or their products into refined products. This definition counts feedstocks for petrochemical plants and refineries as industrial consumption. It also counts energy consumed by an LNG facility as industrial consumption. It excludes the feedstocks of LNG plants ;and fuel consumption by conditioning plants, pump stations, fuel used on lease, shrinkage, injection and flared gas.

Definition 3: Industrial use consists of any consumption of natural gas, crude oil, or their products in combustion (except in oil and gas transport and extraction) or their chemical transformation into refined products. This definition permits the feedstocks of refineries to be counted as industrial consumption. It excludes fuels used in pump stations, in conditioning plants, fuel used on lease, and gas shrinkage, injection, or venting.

Definition 4: Industrial use consists of any use of natural gas, crude oil, or their products in combustion, or their transformation into chemically different products. This definition permits feedstocks of refineries to be counted as industrial consumption, as well as energy consumption in conditioning plants and pump stations. It excludes injected gas, which is ultimately recoverable for other uses, and LNG processing, which is considered an export. Definition 4 will be used for the purposes of this report.

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[3] However, see the short discussion of legislative intent beginning on page 9 of Kramer, Williams and Erickson, op. cit. That study raises many of the issues regarding surplus gas and oil discussed in this report.

None of the four definitions treats industrial use (including transportation) to include gas injected to enhance oil recovery, since in theory this gas remains part of the ultimately recoverable gas reserves of the state. Thus, it is not "consumed."

Intrastate

It is unclear what is meant by intrastate consumption. Some uses, such as combustion of oil and gas products in fixed capital facilities in Alaska, are reasonably easy to categorize as intrastate. There are several uses in transportation which are not obviously within Alaska. These categories include the fuel burned in marine vessels such as cargo vessels, ferries, and fishing boats, and fuel burned in international interstate air travel. There are multiple ways to approach the definition of this consumption. The first is a sales definition: the fuel used in transportation which is sold in Alaska. The second approach is to base consumption on fuel used in Alaska or related to Alaska's economy and population, regardless of the point of sale. This results in three logical definitions, described below:

Definition 1: Intrastate consumption in transportation includes all sales of fuels to motor vehicles, airplanes, and vessels in Alaska, including bonded fuels. It excludes fuel consumed by motor vessels which was purchased in other states, and fuel consumed by airlines between Alaska locations unless the fuel was sold in Alaska. It also excludes out of state military fuel purchases.

Definition 2: Intrastate consumption includes fuel consumed by motor vessels, airlines, and vehicles engaged in Alaskan economic activity. It includes use of fuel by American fishing boats in Alaskan waters regardless of where the fuel was purchased, use of fuel purchased in Washington State by Alaska State ferries, and fuel consumed by ships and aircraft involved in Alaska trade. It excludes sales to aircraft on international flights (bonded and unbonded), but includes military out of state purchases.

Definition 3: The final definition is a compromise between the first two. It includes all fuel purchased within the state, plus military uses, but excludes fuel purchased out of state except for military uses.

The basic definition in this report is the third definition. By excluding bonded and exempt jet fuel, the report also approximates Definition 2. Lack of data on out-state purchases by the military makes Definition 1 impractical.

How These Needs Are To Be Met

Any analysis of how the oil and gas needs of the intrastate domestic and industrial sector are to be met could include several sources of supply: state royalty oil and gas, in-state oil and gas reserves under other ownership, probable extensions of proven reserves, and imports of crude oil, petroleum products, and (in theory) natural gas.

APPENDIX F

ALASKA REFINERIES AND TRANSPORTATION FACILITIES

STATE OF ALASKA
PETROLEUM PROCESSING PLANTS

NIKISKI	PLANT CAPACITY	DATE PLANT IN OPERATION	DATE EXPANSIONS	PLANT PRODUCT	DESTINATION
Chevron Refinery	18,000 BPD	1962	1983 Asphalt capacity increased from 280,000 to 400,000 BPY	JP4, Jet A, Furnance Oil, Diesels, Fuel Oil, Asphalt, Unfinished Gasoline.	JP4, JA50, Furnance Oil, Diesels and Asphalt for Alaska; Unfinished gasoline, High Sulfur Fuel oil to Lower-48 states.
Tesoro Refinery	48,500BPD; Crude Unit to 80,000 BPD in 1985 for No. Slope Crude Hydrocracker to 9,000 BPD. 14.5 TPD Sulfur Plant	1969 (17,500BPD)	1974, 1975, 1977,1980 1984 Hydrocracker 9000 BPD, Reformer (to 10,000 BPD from 6,000 BPD)	Propane, Unleaded, Regular, and Premimum Gasoline, Jet A, Diesel Fuel, No. 2 Diesel, JP4 and No. 6 Fuel Oil	Alaska except No.6 Fuel Oil to Lower-48 states
Phillips-Marathon LNG	230,000 MCF/Day	1969		Liquified Natural Gas	Japan, by tanker, 2 tankers capacity 71,500 cu.m. each, avg. one ship every 9 days.
Union Chemical	Ammonia 1,100,000 tons/yr. Urea 1,000,000 tons/yr.	1969	1977	Anhydrous Ammonia, Urea Prills and Granules.	West Coast and export by tanker and bulk freighter
INTERIOR ALASKA					
North Pole Refinery	46,600 BPD; 90,000 BPD BPD in 1985 for asphalt, leaded and unleaded gasoline, diesel and heating fuels, jet fuels.	1977	Fall 1980; Naptha Stabilizer Column 11,000 BBL, charge capacity, crude oil increased from 25,000 to 45,000 BPD. 1985 Asphalt capacity 2300 BPD	Military Jet Fuel (JP4) 3000-4000 BPD; Commercial Jet A Fuel, 5000-6500 BPD, Diesel Fuel No. 1, 1800-2100 No. 2, 1800-2500 BPD, Diesel Fuel No.4, BPD, 2800-3200 BPD, Asphalt BPD	Fairbanks area, Nenana and river villages, Eilson AFB, Delta Junction, Tok, Glenallen, and Anchorage area
Petro Star Refinery	6,000 BPD	1985	1988: Aviation Gas	Kerosine, #2 Diesel	Alaska North of Alaska Range.

Survey of operating refineries in the U.S. (state capacities as of January 1, 1986)

State	No. plants	Crude capacity — b/cd	Crude capacity — b/sd	Charge capacity, b/sd — Vacuum distillation	Thermal operations	Cat cracking — Fresh feed	Cat cracking — Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Production capacity, b/sd — Alkyla-tion	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Alabama	2	124,500	129,900	34,000	10,000	—	—	27,000	—	28,000	29,500	—	7,000	—	10,500	8.0	400
Alaska	6	203,700	213,157	—	—	—	—	12,000	9,000	—	12,000	—	1,800	—	8,000	12.8	—
Arizona	1	5,000	5,263	1,500	—	—	—	—	—	—	—	—	—	—	1,000	—	—
Arkansas	4	64,170	67,200	34,425	—	18,500	775	9,000	—	—	18,000	4,400	—	6,100	11,500	2.8	—
California	30	2,338,993	2,459,317	1,325,265	493,050	595,500	65,400	524,800	366,000	438,000	825,380	105,100	15,200	26,100	73,154	950.9	19,040
Colorado	2	79,500	82,500	28,000	—	23,000	1,500	17,000	—	—	25,500	—	—	—	3,300	—	—
Delaware	1	140,000	150,000	95,000	44,000	60,000	15,000	53,000	19,000	—	110,000	8,000	3,370	—	—	40.0	2,180
Florida	1	17,500	19,000	10,000	—	—	—	—	—	—	—	—	—	—	—	—	—
Georgia	2	35,000	36,500	—	—	—	—	—	—	—	—	—	—	1,000	25,500	—	—
Hawaii	2	109,500	118,426	58,000	—	22,000	—	13,000	16,000	—	16,500	4,500	1,500	—	1,300	19.5	—
Illinois	7	914,600	917,000	334,150	132,700	340,000	35,600	292,900	66,500	35,000	478,100	84,600	17,300	5,350	36,500	64.3	6,175
Indiana	4	412,200	424,500	230,200	24,000	166,000	6,600	86,500	—	62,000	149,800	29,200	31,000	6,400	43,500	—	1,370
Kansas	6	311,700	352,383	101,000	51,000	110,000	9,000	84,600	3,190	40,000	127,100	30,500	13,969	2,500	4,000	—	2,070
Kentucky	2	218,900	226,300	90,000	57,600	100,000	—	53,500	—	40,000	130,300	12,000	17,400	8,600	30,000	20.0	—
Louisiana	17	2,244,633	2,339,658	880,300	383,300	796,100	42,300	474,500	139,700	248,500	874,600	164,400	56,200	35,900	55,500	162.6	13,558
Michigan	4	118,100	125,094	26,000	—	45,000	1,300	33,000	—	12,500	36,700	8,200	—	—	8,650	—	—
Minnesota	2	222,143	229,220	132,000	48,000	78,000	1,000	39,000	—	86,500	114,200	14,400	8,000	—	49,000	20.0	2,500
Mississippi	5	362,300	383,104	287,000	70,000	74,000	7,400	95,800	68,000	189,000	59,800	19,700	5,500	2,000	40,600	215.0	3,450
Montana	5	142,800	149,200	55,250	9,900	50,600	7,700	37,700	4,900	14,000	103,400	10,700	5,400	—	15,500	19.3	425
Nevada	1	4,500	4,700	2,500	—	—	—	—	—	—	—	—	—	—	—	—	—
New Jersey	6	415,000	441,368	235,400	34,500	251,000	37,000	86,500	—	65,500	250,500	21,000	41,000	8,500	73,000	11.0	975
New Mexico	3	66,375	69,500	6,000	—	27,400	2,375	17,300	—	—	29,600	3,200	—	—	3,500	—	—
North Dakota	2	62,800	65,400	—	—	26,000	5,200	12,000	—	1,200	16,200	3,000	4,000	—	—	—	—
Ohio	5	515,700	540,000	174,000	27,400	190,700	36,800	159,700	83,000	23,000	167,500	31,300	58,400	2,100	19,000	72.0	1,250
Oklahoma	5	374,000	390,131	131,500	27,800	133,500	12,400	97,000	5,000	26,000	133,000	34,900	12,000	9,500	18,300	10.0	1,040
Oregon	1	15,000	15,789	16,000	—	—	—	—	—	—	—	—	—	—	11,500	—	—
Pennsylvania	8	712,900	747,300	329,250	—	264,300	12,300	205,200	55,000	61,000	414,853	43,200	10,600	20,700	33,000	43.5	—
Tennessee	1	57,000	60,000	12,000	—	30,000	—	8,000	—	—	28,200	3,000	—	—	3,500	—	—
Texas	31	4,132,700	4,372,100	1,759,700	342,500	1,587,000	203,050	1,046,800	254,000	775,000	2,155,050	257,700	263,915	94,100	68,800	609.0	10,717
Utah	6	153,875	160,368	45,550	8,500	55,300	9,300	27,500	—	5,500	32,100	11,700	3,750	—	1,700	—	350
Virginia	1	51,000	53,000	29,000	13,500	27,500	2,000	8,750	—	—	24,500	—	—	—	—	—	825
Washington	7	429,850	447,543	219,254	61,000	91,500	23,000	107,800	50,000	25,000	160,500	24,600	2,900	—	19,000	80.0	3,080
West Virginia	2	16,500	17,000	8,175	—	—	—	4,400	—	—	4,800	—	—	5,000	—	1.2	—
Wisconsin	1	32,000	34,000	20,500	—	9,700	1,000	8,000	—	5,800	9,000	1,700	—	—	13,500	—	—
Wyoming	6	153,775	159,000	63,000	9,000	61,500	9,700	30,750	—	10,000	56,100	9,250	1,500	1,500	8,700	—	550
Total	189	15,258,214	16,003,921	6,773,919	1,847,750	5,234,100	547,700	3,673,000	1,139,290	2,191,500	6,592,783	940,250	581,704	235,350	692,004	2,361.9	69,955

ALASKA

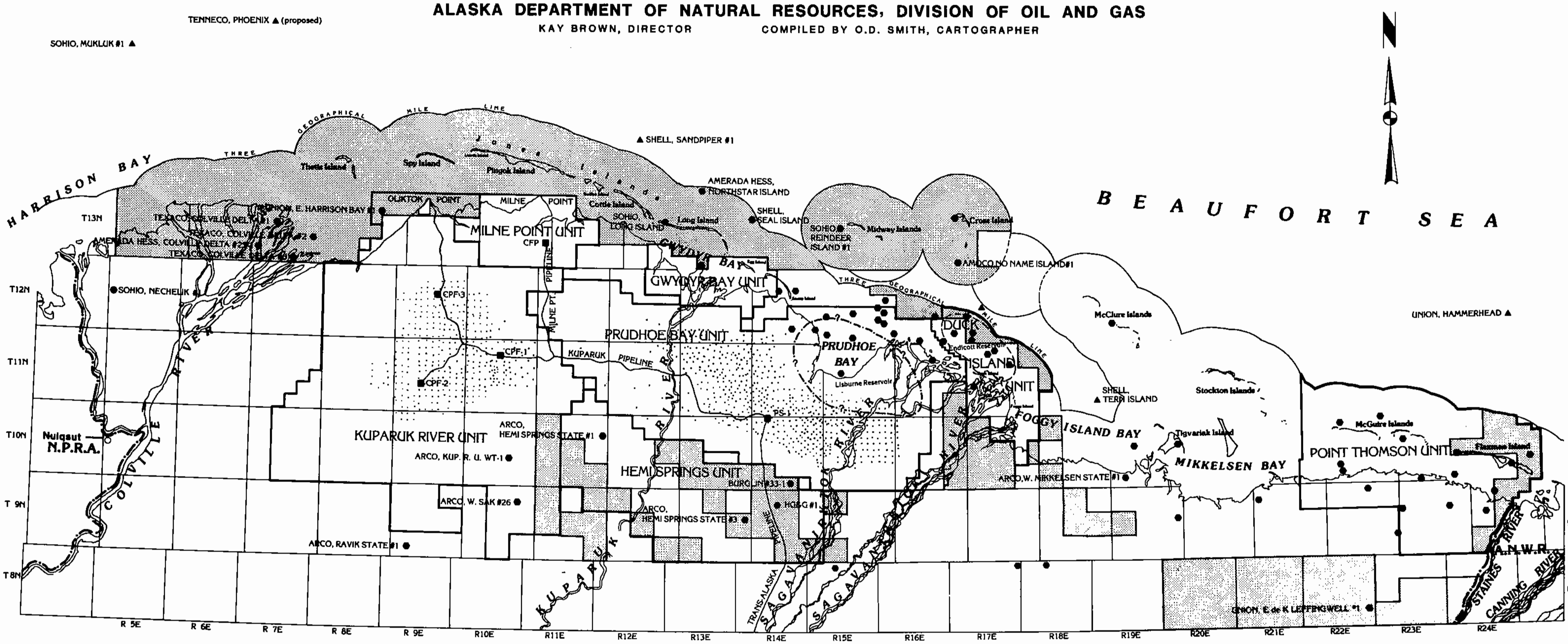
Company and location	Crude capacity — b/cd	Crude capacity — b/sd	Charge capacity, b/sd — Vacuum distillation	Thermal operations	Cat cracking — Fresh feed	Cat cracking — Recycle	Cat reforming	Cat hydro-cracking	Cat hydro-refining	Cat hydro-treating	Production capacity, b/sd — Alky. *Poly.	Aromatics-isomerization	Lubes	Asphalt	Hydrogen (MMcfd)	Coke (t/d)
Atlantic Richfield Co.—Kuparuk	12,000	12,000	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Prudhoe Bay	22,000	22,000	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Chevron U.S.A. Inc.—Kenai	22,000	NR	......	......	......	......	......	......	......	......	......	......	......	6,000	......	......
Mapco Petroleum Inc.—North Pole	70,000	70,000	......	......	......	......	......	......	......	......	......	[1]1,800	......	2,000	......	......
Petro Star Inc.—North Pole	NR	6,000	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Tesoro Petroleum Corp.—Kenai	72,000	80,000	......	......	......	......	[2]12,000	[2]9,000	......	[1]12,000	......	......	......	......	[1]12.8	......
Total	203,700	213,157	—	—	—	—	12,000	9,000	—	12,000	—	1,800	—	8,000	12.8	—

APPENDIX G
OIL AND GAS FIELD MAPS

NORTH SLOPE UNIT MAP

ALASKA DEPARTMENT OF NATURAL RESOURCES, DIVISION OF OIL AND GAS

KAY BROWN, DIRECTOR   COMPILED BY O.D. SMITH, CARTOGRAPHER



EXPLANATION

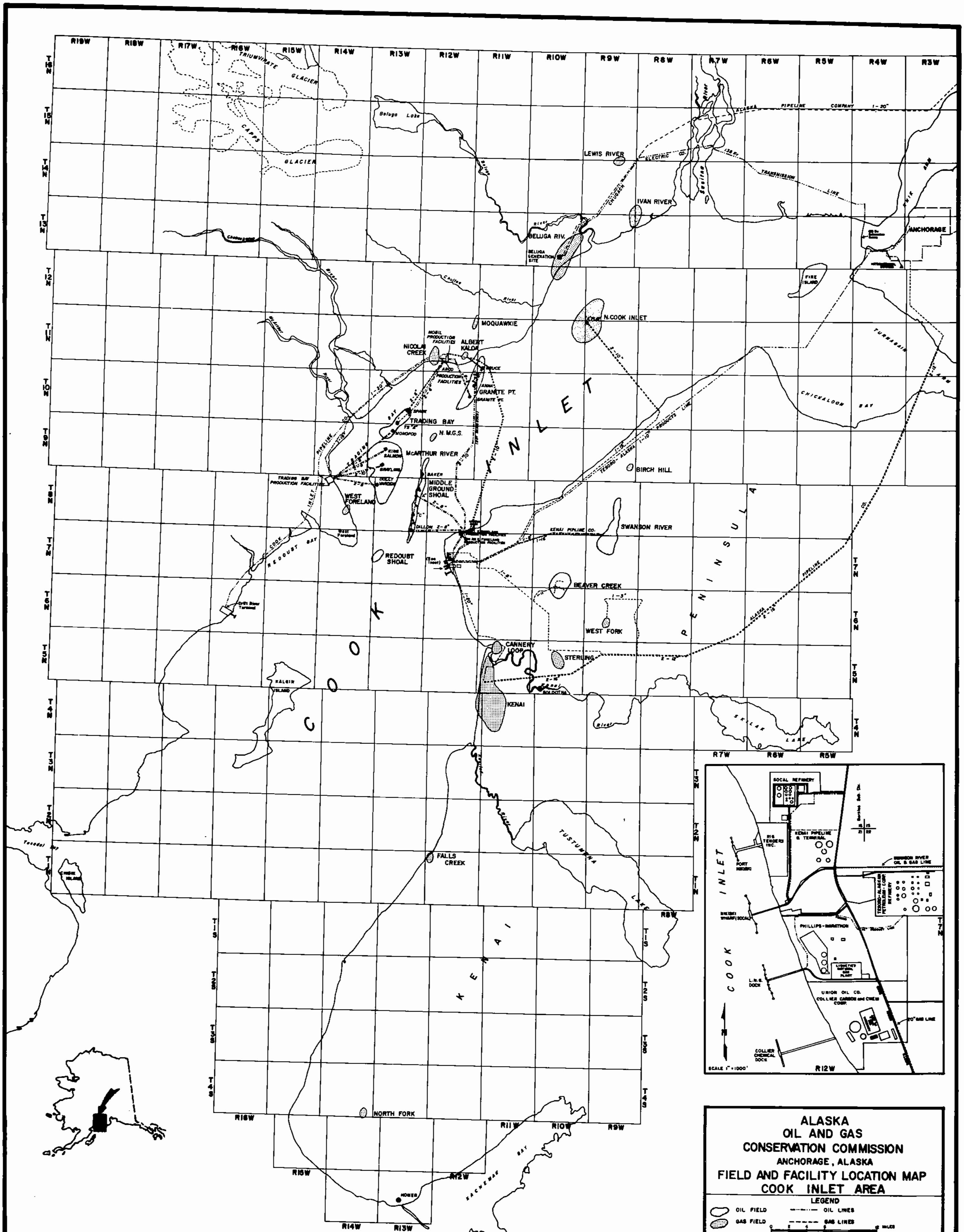
Pump Station #1	PS-1	Net Profit Share Leases	
Central Production Facility	CPF	Central Facilities Pad	CFP
Selected State Exploratory Wells	●	Selected Federal Exploratory Wells	▲
Approximate limits of the Endicott Reservoir	– – ? – – – – ? – – –	Approximate limits of the Lisburne Reservoir	–·–?–·–·–·–?–·–
Development Oil Wells		Oil and Gas Unit Boundaries	———

SCALE 1:250,000

5 0 5 10 15 20 25 MILES

BASE MAP: Transposed From U.T.M. Projection By U.S.G.S., Original Scale 1:250,000, All Townships - Umiat Meridian.

5/86



ALASKA
OIL AND GAS
CONSERVATION COMMISSION
ANCHORAGE, ALASKA
FIELD AND FACILITY LOCATION MAP
COOK INLET AREA
LEGEND
OIL FIELD
OIL LINES
GAS FIELD
GAS LINES
COOK INLET
KENAI PENINSULA
ANCHORAGE
BELUGA RIV.
LEWIS RIVER
IVAN RIVER
MOQUAWKIE
NICOLAI CREEK
ALBERT KALOA
GRANITE PT.
N.COOK INLET
TRADING BAY
N.M.G.S.
McARTHUR RIVER
MIDDLE GROUND SHOAL
WEST FORELAND
REDOUBT SHOAL
BIRCH HILL
SWANSON RIVER
BEAVER CREEK
WEST FORK
CANNERY LOOP
STERLING
KENAI
FALLS CREEK
NORTH FORK
HOMER
TRIUMVIRATE GLACIER
CAPPS GLACIER
CHICKALOON BAY
TURNAGAIN ARM
TUSTUMENA LAKE
SKILAK LAKE
KACHEMAK BAY
KALGIN ISLAND
FIRE ISLAND
SOCAL REFINERY
KENAI PIPELINE & TERMINAL
PHILLIPS-MARATHON
UNION OIL CO.
COLLIER CARBON and CHEM. CORP.
COLLIER CHEMICAL DOCK
L.N.G. DOCK
SCALE 1" = 1000'
R12W

APPENDIX H

ACKNOWLEDGEMENTS

ACKNOWLEDGEMENTS

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