

SCOMM

96:1

COMMITTEE: HOUSE O&GDATE: 2/14TIME: 10:08SUBJECT: ONR overview by O&G DivisionMEMBERS: Rep. Rokeberg, Ogan, Cr. Davis, B. Williams, B. DavisT. Brice. D. Finkelstein.

Page 1 of 8

SPEAKER	TAPE#	SIGNIFICANT INFORMATION
Rokeberg	000	Called the Committee to order at 10:08
		Members Present: Rep. Rokeberg, Ogan, Williams, Finkelstein. Aquorum is Present.
Ken Boyd.	017	Acting Dir. for Div. of Oil & Gas. (Began Slides)
	028	Referred to packet. Recent activity & Discoveries Printed brochure/Lobby for ANWR.
	047	Walk the Committee through the business of the Oil & Gas division.
	070	Started w/ Petroleum Revenues. 4 Categories Bonuses, Rents, Royalties, Taxes.
		every lease in Alaska has a rent.
Rokeberg	109	Is that all taxes
Boyd	110	Yes.
	115	Most oil comes off of State land.
Roke	128	Sub-surface Rights?
Boyd	133	We do share the sub-surface w/ some groups. They continued the dialogue.
	150	Where does the \$ go.
		50% to perm fund Since 1979.
	165	Slide on Oil field production. The trend of production is down.
	181	Geological-Maps. 50 little Pieces.
	195	Cabin at Honolulu Creek.
	215	There are many areas that are well known, but poorly explored.
~~Ken Boyd.~~		
Rokeberg	230	17. Billion Barrels of oil.
Boyd.	235	those numbers are very speculative.
		We must explore them.

COMMITTEE: _____ DATE: _____ TIME: _____

SUBJECT: _____

MEMBERS: _____

Page 2 of 8

SPEAKER	TAPE#	SIGNIFICANT INFORMATION
Boyd	245	The interior of Alaska is Gas Prone.
	259	Slide. Economic Basement. There are 10 more oil & Gas Rocks.
	277	Geomagnetic Data are used in the preliminary stages of Exploration.
	291	4 types of Trapping Methods. Simplest is the Antecline. Saudi Arabia is an Antecline
	308	The next type is a fault line - the Oil & Gas is trapped there. These two are most common in AK.
	325	Stratigraphic Traps may be most prevalent in AK. They are very hard to find. Sunfish - Sourdough.
	340	An example of a Marine Seismic Survey. (Oil at Sea). - 3 mile Cable. in the cable are hydrophones. This measures the sub-surface.
	365	Much like the info from an Earthquake Seismograph. The hydrophones will show you a picture of the sub-surface
	375	The numbers on the slide indicate the time it takes the sound wave to move.
	395	Scientists use this info to interpret the Geology of the sub-surface. (on slide)
	420	The interpreter will use several of these to make a map of the sub-surface
	433	Take all the Data & make a map.

COMMITTEE: _____ DATE: _____ TIME: _____

SUBJECT: _____

MEMBERS: _____

Page 3 of 8

SPEAKER	TAPE#	SIGNIFICANT INFORMATION
Ken Boyd	443	Industry will be given all seismic Data.
	452	(slide) 2 dimensional seismic Data.
		3-D Data is much more sophisticated & expensive.
	470	AK. is now beginning to get involved in 3-D Data.
	477	It provides a method to trap stratigraphic traps.
Rakeberg	480	Was the \$ appropriated & how much.
Boyd	485	We went to a trade show & recieved a "Capital Appropriation".
	499	90% of Data in AK is 3-D.
Rake	503	Have you purchased the hardware. Who did you buy it from
Boyd.	510	Can't Remember name
Rake	515	Not on-line yet?
Boyd	517	(New slide) stated the new stratigraphic Data can find new oil near existing fields.
	532	Primary Producing fields in AK. (slide.) Production numbers.
		Size of Prudhoe Bay compared w/others.
	544	Some smaller fields are all on line now.
		BP Projects 95% of oil w/directional drilling
	556	Discussed fields that are not on line.
		Estimated recoverable = 147 million Barrels of Perhaps 20 billion Barrels (West Sak).
	572	Hamerhead field.
	578	Prospect but not Commercial as a stand alone Project.

COMMITTEE: _____ DATE: _____ TIME: _____

SUBJECT: _____

MEMBERS: _____

Page 4 of 8

SPEAKER	TAPE#	SIGNIFICANT INFORMATION
Boyd	585	Soursberg on ANWR Roster
Williams	587	Explain a "Cold oil field".
Boyd.	589	It relates to the Temp of the earth.
Roke	591	
Boyd.	596	100 million Barrels - 150 million Barrels.
Roke.	600	of Recoverable oil
Boyd.	601	Yes
Roke.	607	Test wells
Boyd.	610	The # of Barrels per day.
		The important #
		The "String of Pearls"
	624	Units.
		Unitization: All oil from Ak comes out of units: A unit is a combination of leases.
	638	Unitization: Uses fewer facilities & for that reason is environmentally sound.
		-Discussion w/Chairman Rokeberg.
Boyd.	650	Price of oil: This is a difficult subject. mentioned Chuck Logsdon's Overview.
		How is oil Priced.
	667	West Coast (Royalty Settlement Price).
	675	Base Value - 7 Crudes
		From the Price you subtract Transportation costs, Tax tariffs, Field costs of Cleaning & Dehydrating.
Boyd	695	What's Happening.
Chair Roke	697	Smin Break, Reconvene at 11:00.
Roke	7017	Called a recess at 10:55
Rokeberg	7000	Reconvened the committee at

(Next side of tape.

COMMITTEE TAPE LOG

COMMITTEE: _____ DATE: _____ TIME: _____

SUBJECT: _____

MEMBERS: _____

Page 5 of 8

SPEAKER	TAPE#	SIGNIFICANT INFORMATION
	side B	
Boyd	707	Some recent activity on North Slope. Also there is a handout. The slide is recent. Two Oylors on Kuvlum are announced discoveries
	760	2 wells in? Pedani? Capable of Production. BP Cascade well south of Milvi Pt.
	770	Culville Delta - lots of Drilling
Roke	801	Southerly Wells not successful
Boyd.	803	Correct Thrust fault. - Brooks Range. (Gas Prone)
	823	Cook Inlet: Sunfish ARCO thought they found a new field. The 3-D survey did not look promising
Rokeberg	850	Gas well?
Boyd.	851	Don't know - 2 sessions ago we came to get it to drill for "Coalbed Methane" Ak has 1/2 the coal in the U.S.A. 877 Drilled the well & found that the coal has a high potential for coalbed ~~meth~~ methane. 900 C&A Coalbed Methane may be used in Rural villages.
Ogan	910	His district: How extensive is the prospect of coal in the area?
Boyd.	919	Very extensive. I will send you copies of the report.
Ogan	934	Make some new info on Coalbed Methane as well.

COMMITTEE: _____ DATE: _____ TIME: _____

SUBJECT: _____

MEMBERS: _____

Page 6 of 8

SPEAKER	TAPE#	SIGNIFICANT INFORMATION
Roke		
Boyd	945	Excellent Ques:
		The main question is who owns the gas. I don't know the answer to that.
	958	What kind of well is a Coalbed Methane well.
	970	This is not covered in statute.
	980	Can't answer.
Rokeborg	982	The Coal Estates - Existing Leases
Boyd.	985	I'm not familiar with that.
	996	The Big Lake Test.
Boyd.	canter slip. 004	The new oil & Gas leasing schedule, which shows the lease & sales that are planned.
	025	Cook Inlet Brokering sale in ~~late~~ October.
		These are basically "leftovers"
	040	North Slope Sale. (Shaviovik)
		The sales are few, but large.
	060	Lease Sale Program has been very successful. We have offered sales in the interior, but no one is interested.
	078	License: Oil & Gas Exploration Licensing. North Slope & Cook Inlet are off limits to this.
	084	10,000 acres to 500,000 acres for exploration.
	097	They are obligated to spend a certain dollar amount on exploration.
	113	We are writing the regs. for this law.
	120	Exploration incentive Credits: The commissioner is given a briefing on the Area.

COMMITTEE: _____ DATE: _____ TIME: _____

SUBJECT: _____

MEMBERS: _____

Page. 7 of 8

SPEAKER	TAPE#	SIGNIFICANT INFORMATION
Boyd	132	This is discretionary by the Commissioner. Ex. \$100 per. foot.
	144	This is an extension of that Program.
	160	The Program has a \$30 million dollar Cap.
Rokeberg	165	~~the~~ This was put in place.
Boyd.	170	There are two programs. we are almost done w/ the regs.
	180	Dialogue between Chairman Rokeberg.
Ogaw	185	The incentive Credit & Licence, are these in house Regs. or Laws.
Boyd.	192	These are laws. & we
Ogaw	197	How long ago were they introduced.
Boyd.	200	The concept was set 3 yrs ago. & Passed last session
Roke	206	Names of bills.
Boyd.	209	~~169~~ Gave bill #5
	212	ANWR
		Reduced impacts & Enhanced Environ protection.
	224	Directional Drilling - Drill sights have gotten smaller.
	237	Service areas & Gravel pads have disappeared.
	249	The debris is ground & shot back into the well.
Roke	250	is that done at the well
Boyd	251	It depends / sometimes.
Rokeberg	263	well in ANWR.
Boyd.	265	The well is sealed. Very tight hole. the well is in Katavuk.

Producing Fields of Northern Alaska

Status	Years in Production	No.	Field Name	Year of Discovery	Projected Ave. 1994 Daily Prod. (x1000 bbls/day)	Estimated Original Recov. Reserves	Cumulative Production Thru 1993	Remaining Reserves As of 1/94	Est. Ultimate Recovery As of 1/94	Est. Percent Depleted As of 1/94
Oil Production (Millions of Barrels)										
P	1969-present	1	Prudhoe Bay	1967	1,078	9,590	8,307	3,618	11,925	69.7%
P	1981-present	2	Lisburne	1967	24	400	98	83	181	54.2%
P	1981-present	3	Kuparuk River	1969	315	1,200	1,070	1,142	2,212	48.4%
P	1985-present (1)	4	Milne Point (2)	1969	20	60	34	81	115	29.5%
P	1993-present	5	Prudhoe Bay Other (3)	1970, 1976	6	25	1	25	26	3.2%
P	1986-present	6	Endicott (4)	1978	100	375	243	262	505	48.1%
P 4/94	1994	7	Niakuk (5)	1985	10	55	0	55	55	0.0%
P	1993-present	8	Point McIntyre	1988	90	300	2	356	358	0.5%
TOTALS:						12,005	9,755	5,622	15,377	
Gas Production (Billions of Cubic Feet)										
P	1958-present	1	South Barrow	1949	not available	25	21	4	25	84.0%
P	1969-present	2	Prudhoe Bay	1967	not available	28,500	1,631	21,551	23,182	7.0%
P	1981-present	3	Lisburne	1967	not available	635	70	277	347	20.2%
P	1981-present	4	Kuparuk River	1969	not available	640	261	709	970	26.9%
P	1985-present (1)	5	Milne Point (2), (6)	1969	not available	n/a	9	n/a	n/a	n/a
P	1981-present	6	East Barrow	1974	not available	12	7	6	13	53.8%
P	1993-present	7	Prudhoe Bay Other (3)	1976	not available	n/a	1	n/a	n/a	n/a
P	1986-present	8	Endicott (4)	1978	not available	731	71	908	979	7.3%
P	1992-present	9	Walakpa	1980	not available	n/a	1	n/a	n/a	n/a
TOTALS:						30,543	2,072	23,455	25,516	
(1) Milne Point was shut in for 1988 and part of 1987 (2) Milne Point includes Schrader Bluff; Schrader Bluff production commenced in 1991 (3) includes West Beach and N. Prudhoe Bay State (discovered in 1970) together (4) includes Sag Delta North; Sag Delta production commenced in 1989 (5) includes Alapah (Lisburne) (6) Milne Pt. is assigned no gas reserves because most of its gas will be used for production fuel P = producing										
Sources: "Historical and Projected Oil and Gas Consumption", DNR, Feb. 1994; "Estimates of Oil Reserves in Alaska" and "Estimates of Gas Reserves in Alaska", AOGCC, Jan. 1994										

Table 5. Producing fields of Northern Alaska, as of January 1994

Significant Undeveloped Northern Alaska Accumulations

Status	Years in Production	No.	Field Name	Year of Discovery	Projected Ave. 1994 Daily Prod. (x1000 bbls/day)	Estimated Original Recov. Reserves	Cumulative Production Thru 1993	Remaining Reserves As of 1/94	Est. Ultimate Recovery As of 1/94	Est. Percent Depleted As of 1/94
Oil Accumulations					(Millions of Barrels)					
UD	1983-1986 (1)	1	West Sak	1969	0	147	0.755	149	150	0.5%
UD	none	2	Point Thomson/Flaxman	1977 (2)	0	200	0	200	200	0.0%
UD	none	3	Northstar/Seal Island	1984	0	180	0	180	180	0.0%
Gas Accumulations					(Billions of Cubic Feet)					
UD	none	1	Point Thomson/Flaxman	1977	0	3,500	0	3,000	3,000	0.0%
(1) West Sak Pilot Project (2) Flaxman Island accumulation discovered in 1975 UD = undeveloped										
Sources: "Historical and Projected Oil and Gas Consumption", DNR, Feb. 1994; "Estimates of Oil Reserves in Alaska" and "Estimates of Gas Reserves in Alaska", AOGCC, Jan. 1994										

Table 6. Significant undeveloped Northern Alaska accumulations, as of January 1994

Other Undeveloped Northern Alaska Discoveries

No.	Field Name	Year of Discovery	Estimated Original Recov. Reserves
<i>Oil Discoveries (Millions of Barrels)</i>			
1	Umiat	1946	50
2	Fish Creek	1949	n/a
3	Simpson	1950	12
4	Mikkelson	1978	n/a
5	Gwydyr Bay	1981	n/a
6	Tern Island	1983	n/a
7	Hemi Springs	1984	n/a
8	Colville Delta	1985	n/a
9	Hammerhead	1986	n/a
10	Sandpiper Island	1986	n/a
11	Badami	1990	n/a
12	Kuvlum	1992	n/a
13	Fiord (Colville Delta)	1992	n/a
14	Kalubik (Colville Delta)	1992	n/a
15	Cascade	1993	n/a
16	Sourdough	1994	n/a

No.	Field Name	Year of Discovery	Estimated Original Recov. Reserves
<i>Gas Discoveries (Billions of Cubic Feet)</i>			
1	Meade	1950	20
2	Wolf Creek	1951	n/a
3	Gubik	1951	600
4	Square Lake	1952	58
5	East Umiat	1963	n/a
6	Kavik	1969	n/a
7	Kemik	1972	n/a

Table 7. Other undeveloped Northern Alaska discoveries, as of January 1994

Producing Fields of Cook Inlet

Status	Years in Production	No.	Field Name	Year of Discovery	Projected Ave. 1994 Daily Prod. (x1000 bbls/day)	Estimated Original Recov. Reserves	Cumulative Production Thru 1993	Remaining Reserves As of 1/94	Est. Ultimate Recovery As of 1/94	Est. Percent Depleted As of 1/94
Oil Production					(Millions of Barrels)					
P	1958-present	1	Swanson River (federal)	1957	n/a	217	219	11	230	95.2%
P	1968-present	2	Middle Ground Shoal	1962	6.1	162	169	16	185	91.3%
P	1967-present	3	Granite Point	1965	6.2	126	120	14	134	89.6%
P	1967-present	4	Trading Bay	1965	2.2	90	95	6	101	94.0%
P	1965-present	5	McArthur River	1965	17.9	574	561	42	603	93.0%
P	1972-present	6	Beaver Creek (federal)	1965	n/a	4	5	1	6	82.2%
P	1993-present	7	West McArthur River	1991	2	n/a	0	5	5	2.0%
TOTALS:						1,173	1,168	95	1,263	
Net Gas Production					(Billions of Cubic Feet)					
P	1958-present	1	Swanson River (federal)	1957	not available	259.000	0.000	165.000	165.000	0.0%
P	1960-present	2	Kenai	1959	not available	2,496.000	2,081.189	204.000	2,285.189	91.1%
P	1978-present (a)	3	West Fork	1960	not available	n/a	4.049	4.000	8.049	50.3%
P	1965-present	4	Middle Ground Shoal	1962	not available	86.000	91.983	11.000	102.983	89.3%
P	1969-present	5	North Cook Inlet	1962	not available	1,594.000	1,089.657	410.000	1,499.657	72.7%
P	1963-present (b)	6	Beluga River	1962	not available	1,003.000	455.358	375.000	830.358	54.8%
P	1967-present	7	Granite Point	1965	not available	105.000	104.804	33.000	137.804	76.1%
P	1965-present	8	Trading Bay	1965	not available	63.000	69.564	29.000	98.564	70.6%
P	1967-present	9	McArthur River	1965	not available	965.000	617.615	349.000	966.615	63.9%
P	1973-present	10	Beaver Creek (federal)	1965	not available	241.500	127.176	115.000	242.176	52.5%
P	1990-present	11	Ivan River	1966	not available	n/a	11.112	n/a	n/a	n/a
P	1984-present	12	Lewis River	1975	not available	n/a	8.157	n/a	n/a	n/a
P	1990-present	13	Stump Lake	1978	not available	n/a	4.464	185 (c)	194.302 (c)	2.1% (c)
P	1986-present	14	Pretty Creek	1979	not available	n/a	4.838	(c)	(c)	(c)
P	1988-present	15	Cannery Loop	1979	not available	300.000	65.726	226.000	291.726	22.5%
P	1993-present	16	West McArthur River	1991	not available	n/a	0.031	n/a	n/a	n/a
TOTALS:						7,112.500	4,735.723	1,921.000	6,628.121	
(a) West Fork was shut in from 1986 through 1990 (b) Beluga did not produce in 1965 and 1966 (c) Pretty Creek and Stump Lake remaining reserves and ultimate recovery are combined P = producing										

Sources: "Historical and Projected Oil and Gas Consumption", DNR, Feb. 1994; "Estimates of Oil Reserves in Alaska" and "Estimates of Gas Reserves in Alaska", AOGCC, Jan. 1994

Table 8. Producing fields of Cook Inlet, as of January 1994

Other Known Cook Inlet (1) Accumulations

Status	Years in Production	No.	Field Name	Year of Discovery	Projected Ave. 1994 Daily Prod. (x1000 bbls/day)	Estimated Original Recov. Reserves	Cumulative Production Thru 1993	Remaining Reserves As of 1/94	Est. Ultimate Recovery As of 1/94	Est. Percent Depleted As of 1/94
Oil Accumulations					(Millions of Barrels)					
ABND	1904-1933	1	Katalla (Gulf of Alaska)	1902	0	n/a	0.154	n/a	n/a	n/a
UD	none	2	Redoubt Shoal	1968	0	n/a	0.000	n/a	n/a	0.0%
UD	none	3	Sunfish	1991	0	n/a	0.000	77.000	77.000	0.0%
Gas Accumulations					(Billions of Cubic Feet)					
SI	1962-1986	1	Sterling (2)	1961	not available	25.100	2.088	23.000	25.088	8.3%
UD	none	2	Falls Creek	1961	not available	n/a	0.019	13.000	13.019	0.1%
UD	none	3	West Foreland	1962	not available	n/a	0.000	20.000	20.000	0.0%
UD	none	4	North Fork	1965	not available	n/a	0.105	12.000	12.105	0.9%
SI	1968-1977	5	Nicolai Creek	1966	not available	n/a	1.062	2.000	3.062	34.7%
UD	none	6	Birch Hill	1967	not available	11.000	0.065	11.000	11.065	0.6%
SI	1967-1970	7	Moquawkie	1965	not available	n/a	0.985	n/a	n/a	n/a
UD	none	8	Albert Kaloa	1968	not available	n/a	0.119	n/a	n/a	n/a
(1) Includes Katalla, onshore in the Gulf of Alaska (2) Sterling Field has been shut in since 1987 ABND = abandoned UD = undeveloped SI = shut-in										
Sources: "Historical and Projected Oil and Gas Consumption", DNR, Feb. 1994; "Estimates of Oil Reserves in Alaska" and "Estimates of Gas Reserves in Alaska", AOGCC, Jan. 1994										

Table 9. Other known Cook Inlet accumulations, as of January 1994

COMPLETE LISTING OF ALL ALASKA DISCOVERIES

No.	Field/Accumulation	Discovery Date	Fluid Type(s)	Status	No.	Field/Accumulation	Discovery Date	Fluid Type(s)	Status
Northern Alaska					Cook Inlet				
1	Prudhoe Bay	1967	Oil, Gas	P	40	Swanson River	1957	Oil, Gas	P
2	Lisburne	1967	Oil, Gas	P	41	Middle Ground Shoal	1962	Oil, Gas	P
3	Kuparuk River	1969	Oil, Gas	P	42	Granite Point	1965	Oil, Gas	P
4	Milne Point	1969	Oil, Gas	P	43	Trading Bay	1965	Oil, Gas	P
5	Prud. Bay - West Beach	1976	Oil, Gas	P	44	McArthur River	1965	Oil, Gas	P
6	Prud. Bay - N. PB St.	1970	Oil, Gas	P	45	Beaver Creek	1965	Oil, Gas	P
7	Endicott	1978	Oil, Gas	P	46	West McArthur River	1991	Oil, Gas	P
8	Niakuk	1985	Oil	P	47	Kenai	1959	Gas	P
9	Point McIntyre	1988	Oil, Gas	P	48	West Fork	1960	Gas	P
10	South Barrow	1949	Gas	P	49	North Cook Inlet	1962	Gas	P
11	East Barrow	1974	Gas	P	50	Beluga River	1962	Gas	P
12	Walakpa	1980	Gas	P	51	Ivan River	1966	Gas	P
13	West Sak	1969	Oil	UD	52	Lewis River	1975	Gas	P
14	Point Thomson	1977	Oil, Gas	UD	53	Stump Lake	1978	Gas	P
15	Northstar/Seal Island	1984	Oil	UD	54	Pretty Creek	1979	Gas	P
16	Flaxman Island	1975	Oil	UD	55	Cannery Loop	1979	Gas	P
17	Umiat	1946	Oil	UD	56	Katalla (Gulf of Alaska)	1902	Oil	ABND
18	Fish Creek	1949	Oil	UD	57	Redoubt Shoal	1968	Oil	UD
19	Simpson	1950	Oil	UD	58	Sunfish	1991	Oil	UD
20	Mikkelson	1978	Oil	UD	59	Sterling	1961	Gas	SI
21	Gwydyr Bay	1981	Oil	UD	60	Falls Creek	1961	Gas	UD
22	Tern Island	1983	Oil	UD	61	West Foreland	1962	Gas	UD
23	Hemi Springs	1984	Oil	UD	62	North Fork	1965	Gas	UD
24	Colville Delta	1985	Oil	UD	63	Nicolai Creek	1966	Gas	SI
25	Hammerhead	1986	Oil	UD	64	Birch Hill	1967	Gas	UD
26	Sandpiper Island	1986	Oil	UD	65	Moquawkie	1965	Gas	SI
27	Badami	1990	Oil	UD	66	Albert Kaloa	1968	Gas	UD
28	Kuvlum	1992	Oil	UD	Abbreviations P = producing UD = undeveloped SI = shut-in ABND = abandoned  = discovered prior to competitive leasing, 12/59				
29	Fiord (Colville Delta)	1992	Oil	UD					
30	Kalubik (Colville Delta)	1992	Oil	UD					
31	Cascade	1993	Oil	UD					
32	Sourdough	1994	n/a	UD					
33	Meade	1950	Gas	UD					
34	Wolf Creek	1951	Gas	UD					
35	Gubik	1951	Gas	UD					
36	Square Lake	1952	Gas	UD					
37	East Umiat	1963	Gas	UD					
38	Kavik	1969	Gas	UD					
39	Kemik	1972	Gas	UD					

Table 10. Complete listing of all Alaska discoveries

Evolution of Petroleum Development Technology on Alaska's North Slope...

Reduced Impacts and Enhanced Environmental Protection

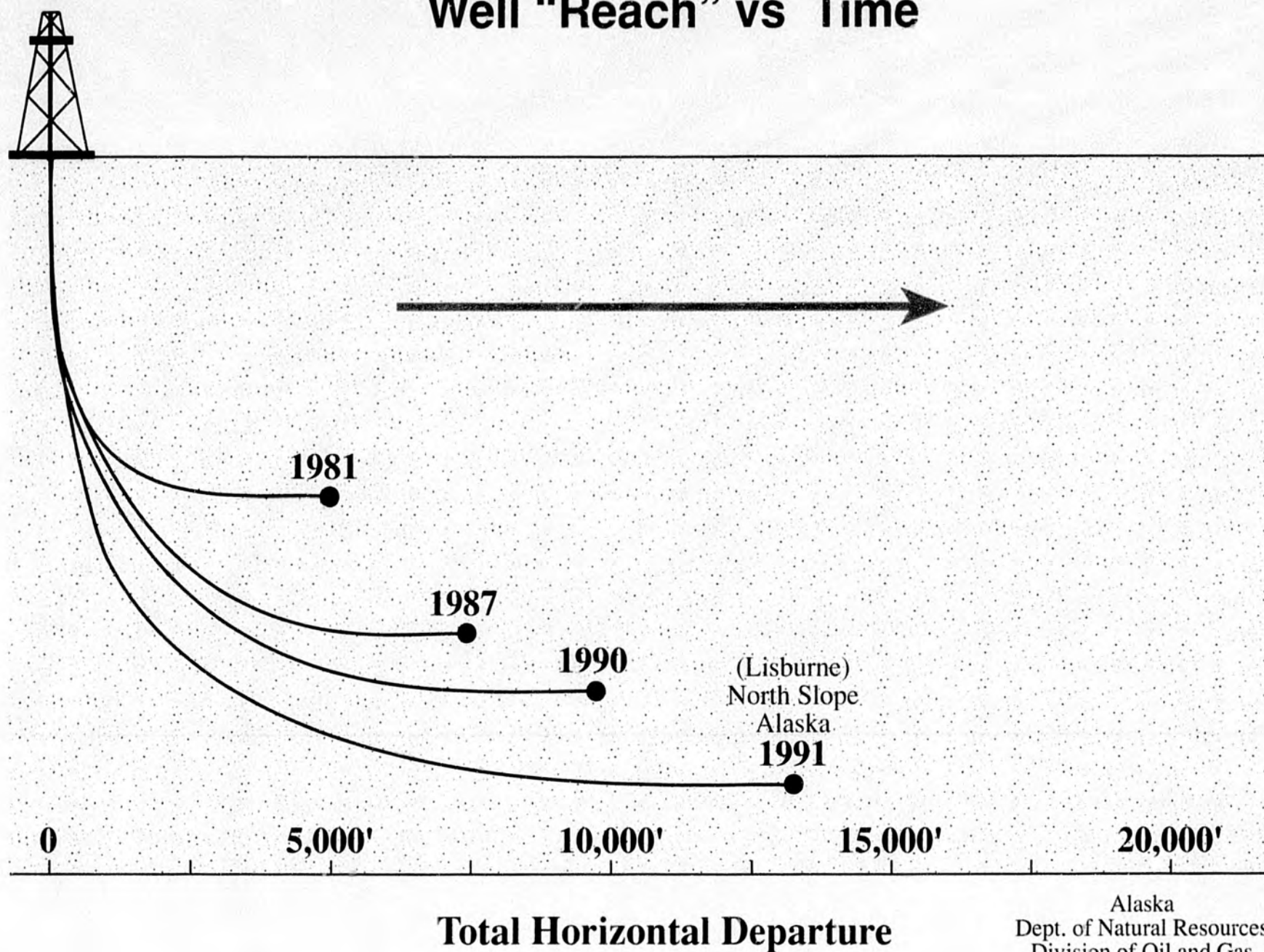


Alaska Department of
**NATURAL
RESOURCES**
Division of Oil and Gas
July 1993

FOLLOWING 20 YEARS OF DEVELOPMENT EXPERIENCE ON THE NORTH SLOPE:

- **SPACING BETWEEN WELLHEADS—REDUCED 91%**
- **SURFACE AREA OF GRAVEL DEVELOPMENT PADS— REDUCED 76%**
- **SURFACE AREA FOR CONTRACTOR SERVICE AREA— REDUCED 95%**
- **GRAVEL ROADS FOR PIPELINE CONSTRUCTION— ELIMINATED**
- **ICE PADS USED IN LIEU OF GRAVEL PADS FOR EXPLORATORY WELLS**
- **UNDERGROUND INJECTION FOR DISPOSAL OF DRILLING FLUIDS**
- **DESIGN AND PERMITTING OF CENTRALIZED WASTE MANAGEMENT FACILITIES — 95% RECYCLING OF ALL ASSOCIATED WASTES**
- **FEWER DRILL SITES NEEDED DUE TO ADVANCES IN DIRECTIONAL DRILLING**
- **RESERVE PITS ELIMINATED OR NEEDED ONLY ON A TEMPORARY BASIS**

Well "Reach" vs Time

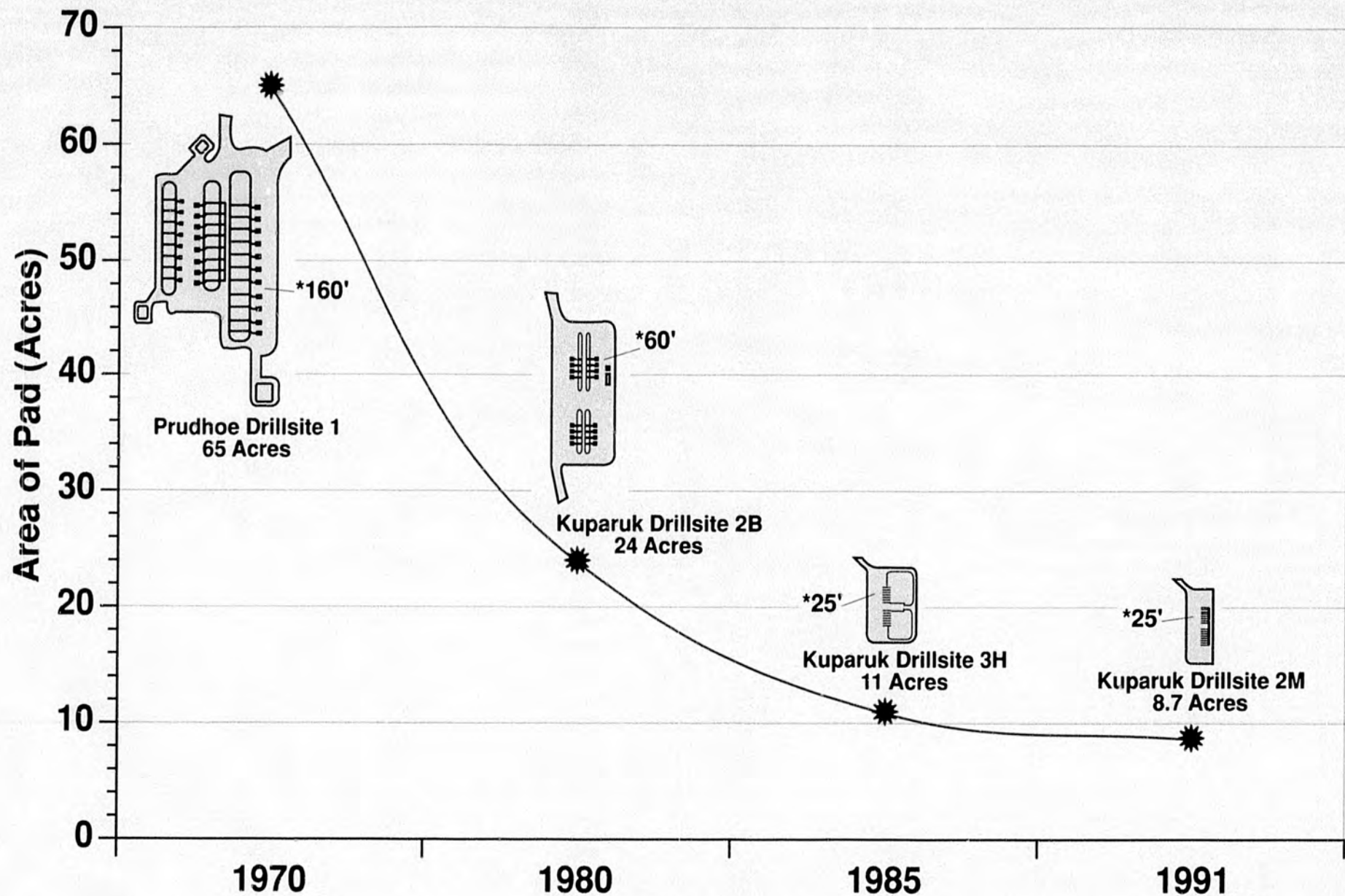


(Lisburne)
North Slope
Alaska

Total Horizontal Departure

Alaska
Dept. of Natural Resources
Division of Oil and Gas
8-29-91

Evolving Consolidation of North Slope Production Pad Size



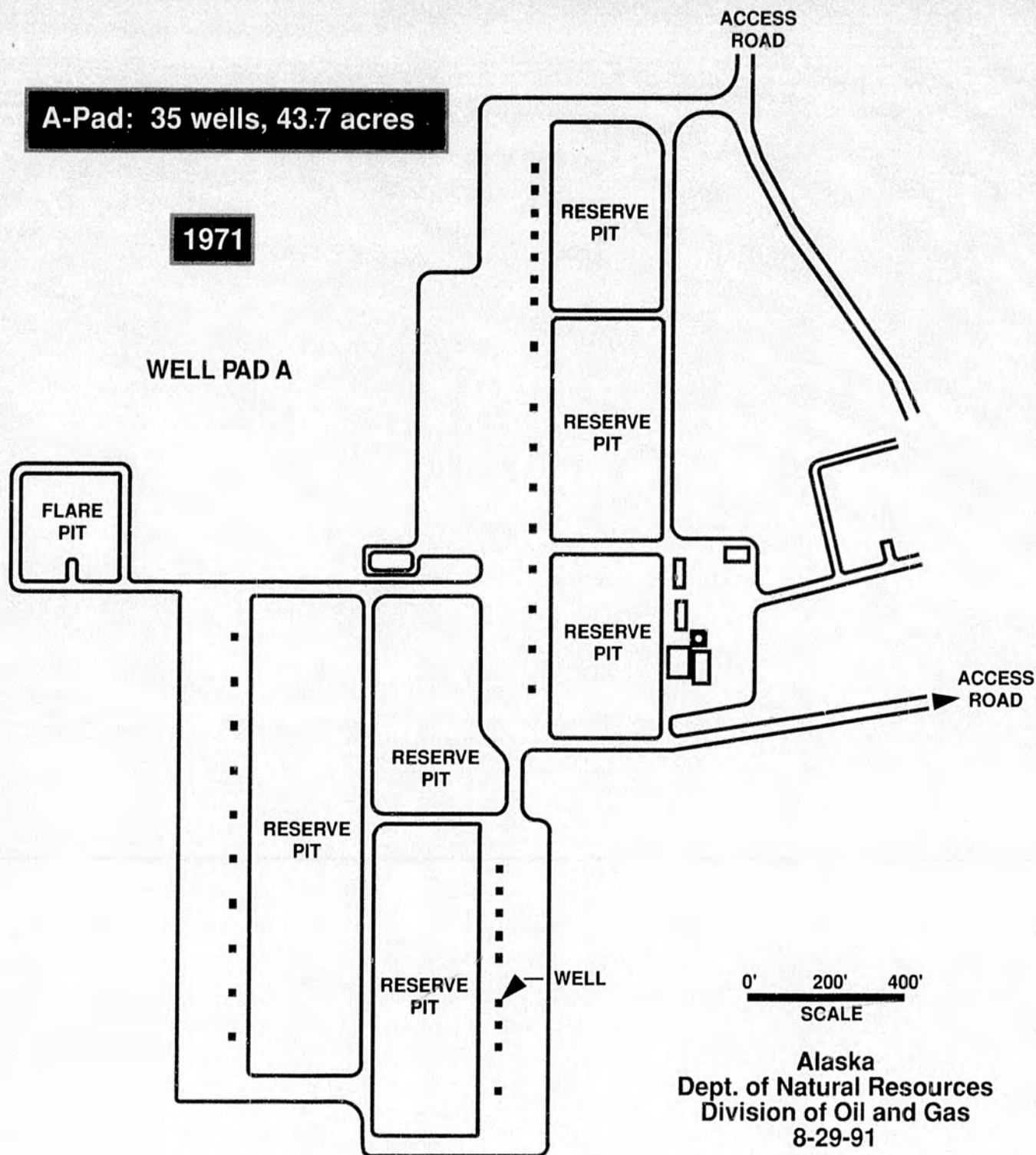
*Well Spacing

Alaska
Dept. of Natural Resources
Division of Oil and Gas
8-27-91

A-Pad: 35 wells, 43.7 acres

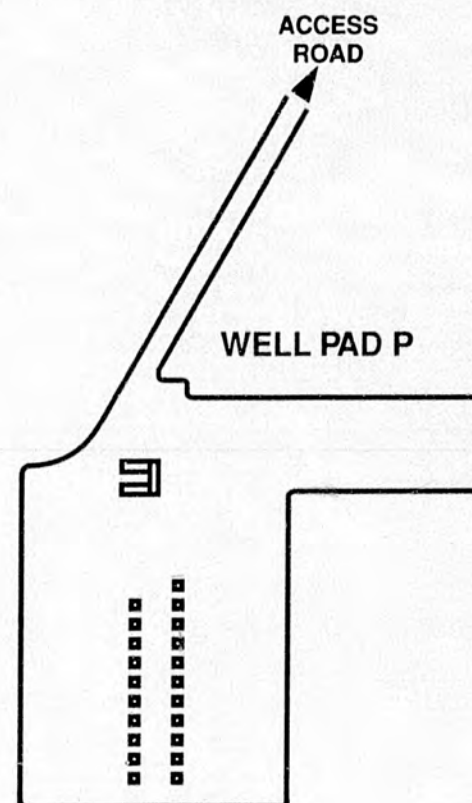
1971

WELL PAD A



P-Pad: 21 wells, 10.5 acres

1989

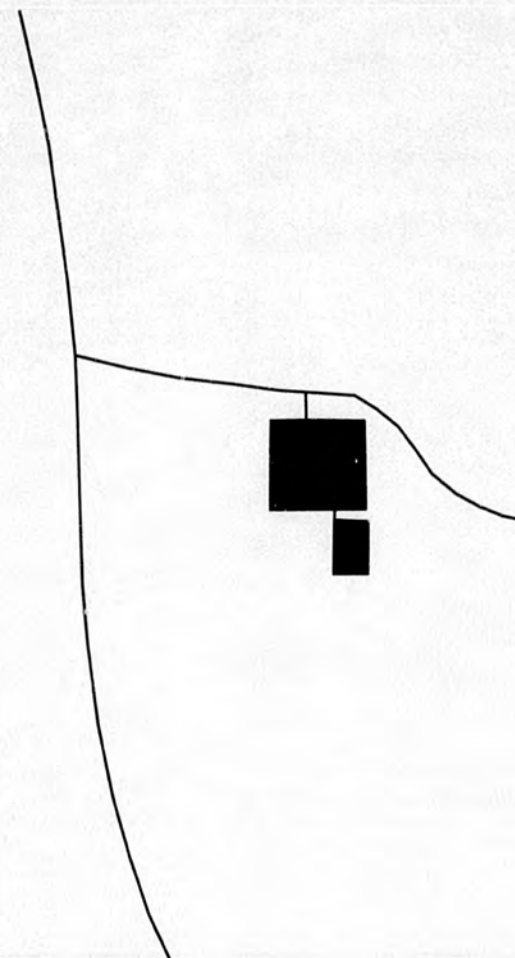
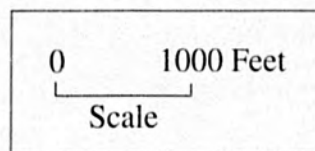
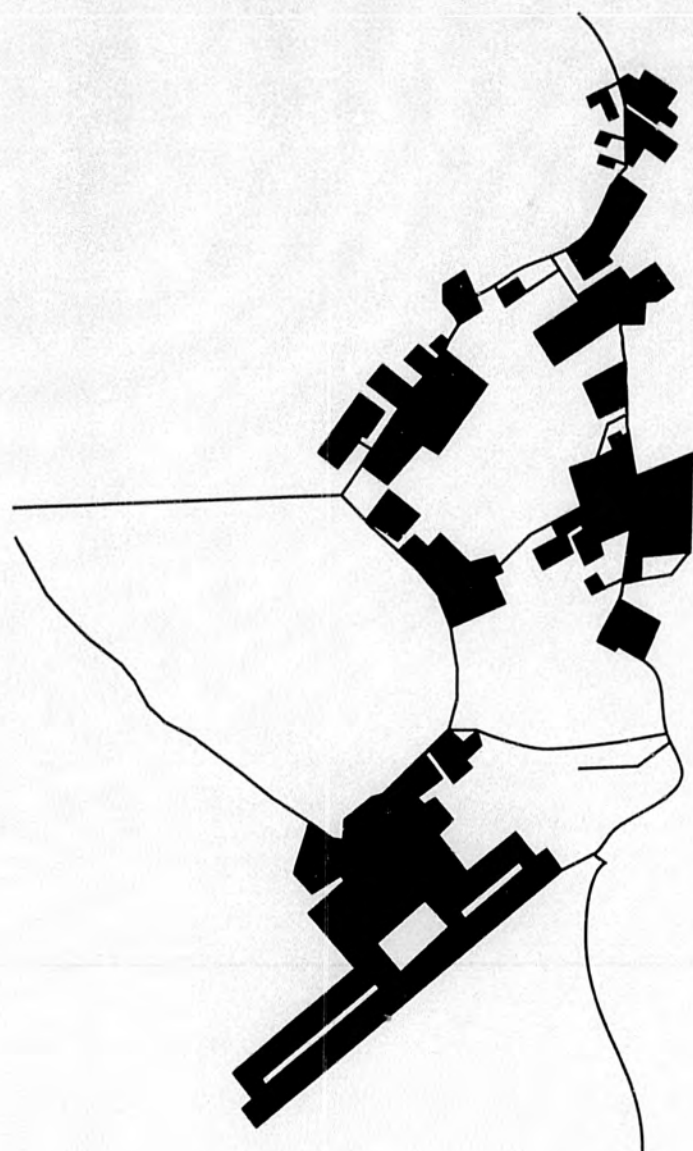


0' 200' 400'
SCALE

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Deadhorse Service Area

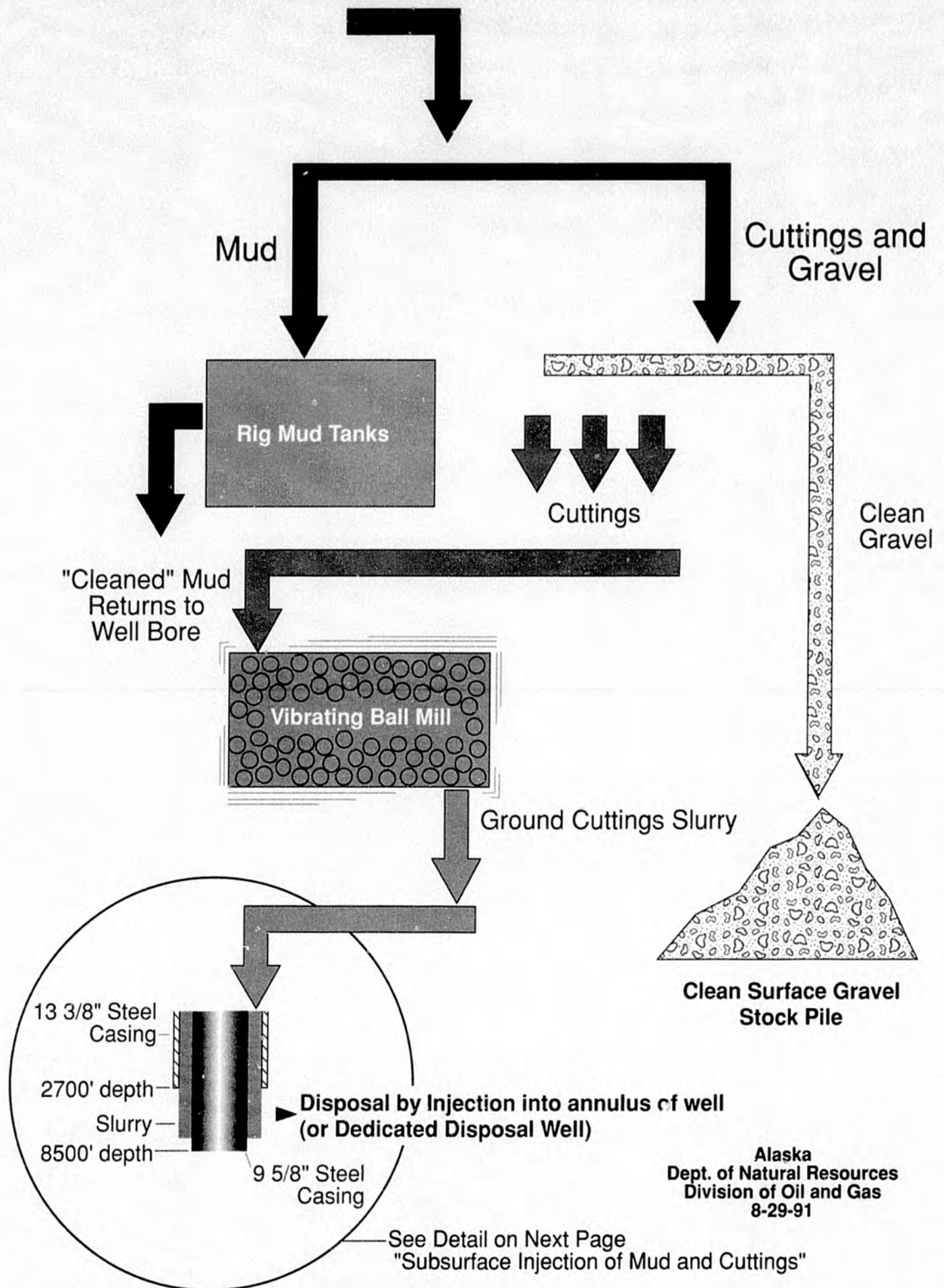
Conceptual ANWR Service Center



Service facilities for the Prudhoe Bay oil fields are located at Deadhorse. These buildings are situated on 1,050 acres. Satellite service facilities at ANWR could be located on only 55 acres, as was done for the Kuparuk oil field.

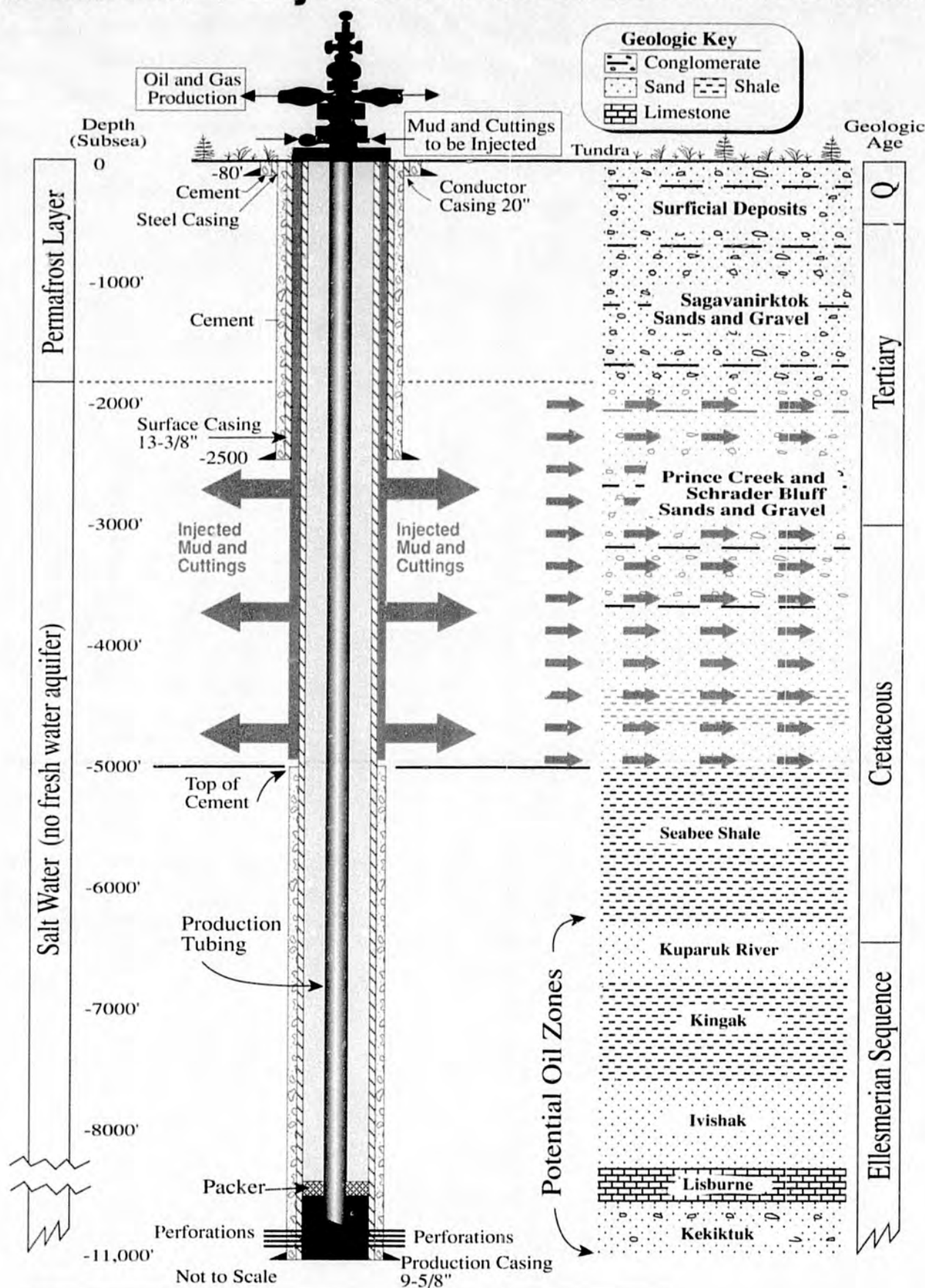
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7-5-93

Mud, Cuttings and Gravel from Well



Alaska
Dept. of Natural Resources
Division of Oil and Gas
8-29-91

Subsurface Injection of Mud and Cuttings

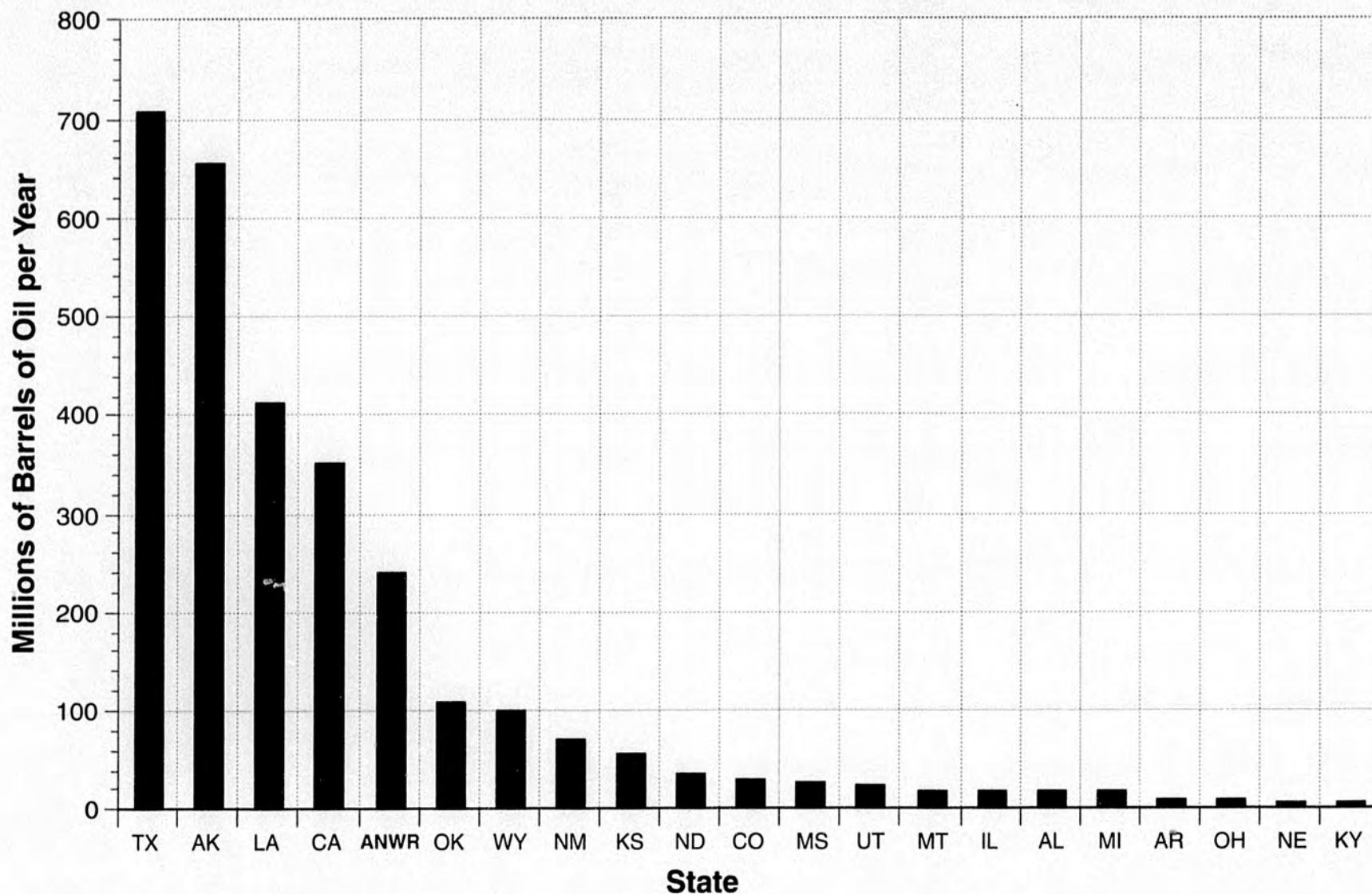


Please Note:

1. When injection phase is completed, the 9-5/8" X 13-3/8" annular space is pumped full of cement and permanently sealed.
2. In the Kuparuk River Unit the surface casing is set through the West Sak interval (to approximately -4000 ss).

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Division of Oil and Gas
8-29-91

Top Twenty Oil Producing States and ANWR



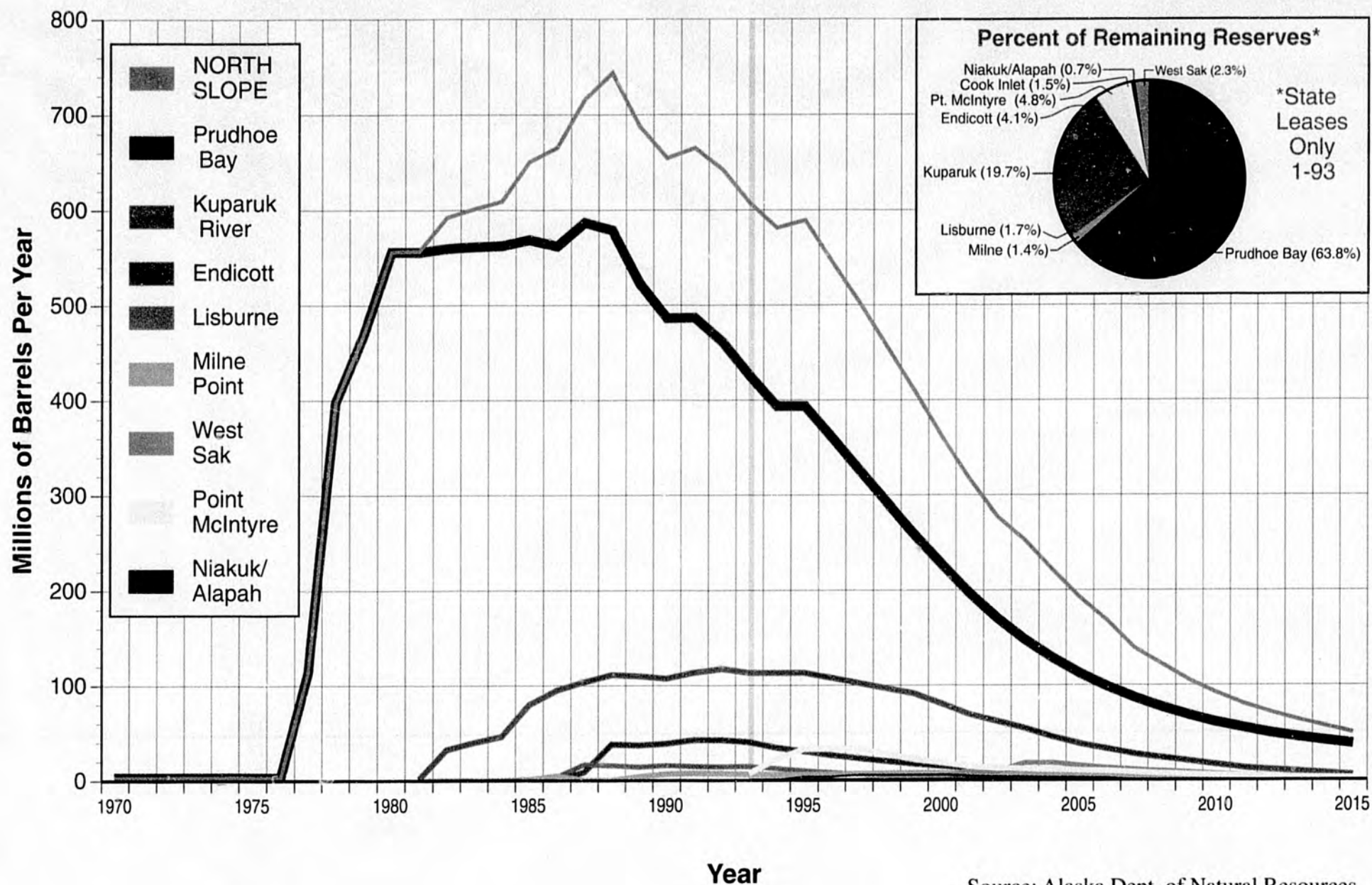
State figures reflect 1991 production.

ANWR figure assumes peak production from mean value economic field.

(Source: Department of Interior)

Alaska Department of Natural Resources
Division of Oil & Gas July 5, 1993

North Slope Historical & Projected Oil Production



Source: Alaska Dept. of Natural Resources
Div. of Oil & Gas January 29, 1993

**Summary of Recent Discoveries
and Proposed New Exploration Drilling**

An Informational Update for the Alaska State Legislature
Prepared by the Division of Oil and Gas

James E. Eason, Director
February 6, 1995

This brief report summarizes significant, recent (1993 and 1994) oil and gas activity in Alaska. It includes data on recent discoveries, specifics on the start-up of production from new pools, and information about proposed, new exploration/delineation drilling ventures. It should be noted that exploration activity is a "moving target"; new developments can occur quickly, conditions can change, and what is proposed today may be different tomorrow. In that regard, not all permitted exploration wells are discussed here, but rather just those that appear -- at this writing -- to have the greatest likelihood of going forward in 1995. Further, much of the information surrounding these ventures is highly sensitive and confidential, and as such, the Division cannot provide any specifics on such topics as the size of new accumulations, the potential commerciality, or others. **No confidential information is included in this report.**

Executive Summary

Two new oil discoveries were announced in Alaska in 1993 and 1994. Both of these discoveries were made by BP on North Slope state leases. These discoveries are the BP Sourdough #2, located within the Point Thomson Unit close to ANWR, and the Cascade #1 and 1A located 6.5 miles southeast of the Milne Point Field. Delineation wells drilled during 1993 on ARCO's eastern Beaufort Sea Kuvlum discovery and ARCO/Phillips 1991 Sunfish produced disappointing results. Based on delineation drilling and new 3-D seismic data, ARCO now believes that neither discovery is commercial on a stand alone basis. Following the 1992 Kalubik #1 and Fiord #1 discoveries, five new exploration/delineation wells were drilled in the Colville Delta area by ARCO during the 1993 and 1994 drilling seasons. The results of these wells have not been made public. ARCO has permitted five additional well locations in the western Colville River area and will probably drill two or three of these locations in 1995. BP plans up to two delineation wells on the 1991 Badami discovery, located along the Beaufort Sea coast west of the Point Thomson Unit. At this time, the first of these delineation wells, Badami #5, is just underway.

During 1993-94 production was initiated on four new North Slope oil fields near or within the Prudhoe Bay unit. The West Beach and Point McIntyre fields began initial production in 1993, followed by Niakuk and North Prudhoe Bay in 1994. Recent and

planned facilities modification and delineation/development drilling in the Milne Point field are expected to more than double the rate of production (currently about 20,000 bbl. of oil per day) at the field by 1997.

New Discoveries

Cascade Discovery

BP Cascade #1 discovery well was completed as an oil well on March 14, 1993 and immediately followed by a successful delineation side-track (the Cascade #1A). The Cascade discovery is located approximately 6.5 miles southeast of the Milne Point Field. Cascade #1 tested oil at a sustained rate of 1,720 barrels of oil per day from the Kuparuk Formation. Other oil bearing zones were encountered but not tested. The #1A side-track confirmed the discovery. BP has indicated that the discovery is an accumulation similar in size to BP's Niakuk field, which contains about 50 million barrels of recoverable oil. BP plans to produce the Cascade discovery through its production facilities at the Milne Point Field.

Sourdough #2 Discovery

BP Sourdough #2 (the #1 location has not yet been drilled) was completed on April 27, 1994 to a total measured depth of 12,600 feet (12,562 tvd). It is located within the southeastern segment of the Point Thomson Unit. In June, the state certified Sourdough No. 2 capable of producing in paying quantities, but no other details have been announced by either the state or BP.

Results of Delineation Drilling on Recent Discoveries

Sunfish Reserve Estimates Decreased

ARCO currently believes that the Sunfish discovery is too small to support stand-alone development. The #1 Sunfish discovery well was drilled on state acreage in northern Cook Inlet and was reported by ARCO in October 1991 to have flowed 41 degree API gravity oil at the rate of 1,100 barrels of oil per day with one million cu ft of gas per day from the "Sunfish sand" of the Tyonek Formation. ARCO completed the first delineation well, the North Foreland State No. 1, about 1.5 miles south and slightly west of the discovery well on November 20, 1992. It confirmed the Tyonek pay zone at the discovery well and also tested two new producing zones, one in the "North Foreland sands" and the other in deeper Hemlock Conglomerate, producing at a combined flow rate of 3,610 bbls of oil and three million cu ft of gas daily.

In January 1993, ARCO and Phillips acquired about 128,000 acres around the discovery in State Oil and Gas Lease Sale 76 for bids totaling about \$66 million. Prior to the sale the two companies held about 63,000 acres in the area. In October of 1993 Phillips completed the third test (# 2 Sunfish) of the prospect from the North Cook Inlet "A"

production platform. This well was drilled 2 miles to the northwest of the discovery well and failed to encounter oil. Two additional ARCO wells completed in December of 1993 to the south of the discovery well (#2 & #3 SCI State) failed to find commercial hydrocarbons. The last Sunfish evaluation well (#3 Sunfish) was drilled to the north of the discovery well. The well was completed on April 2, 1994 and tested 412 bbl of oil per day from the Sunfish sand but failed to encounter the North Foreland sand objective. In September 1994, ARCO announced that it would not develop the Sunfish discovery, stating that the wells and 3-D seismic data indicated that Sunfish was not commercial for the company on a stand-alone basis. ARCO reported that it would not conduct any more exploration or delineation activities on the prospect.

Kuvlum Discovery Determined to be Non-Commercial

ARCO currently believes that its Kuvlum discovery is too small to be commercial as a stand-alone development. The Kuvlum #1 discovery well was completed in the eastern Beaufort Sea in October 1992. The well flowed 3,400 barrels of oil per day of 34 API gravity oil and 2.04 million cubic feet of gas per day from an undisclosed interval above 8,500 feet, and ARCO indicated it could produce oil at rates in excess of 10,000 barrels per day. The discovery is located on the 35,000 acre Kuvlum prospect joint participation area and is about 16 miles offshore and about 64 miles east of Pump Station 1 (PS-1) (total distance to PS-1 is about 80 miles). In 1993 ARCO drilled two delineation wells and a step-out exploration well in the vicinity of the Kuvlum discovery. Kuvlum #2 was completed in September 1993 at a location about 3.5 miles west of the discovery and confirmed the producing reservoir tested in the discovery well. Kuvlum #3 was completed in October 1993 at a location one mile north of the discovery and encountered hydrocarbons, but not a commercial quality reservoir. #1 OCS Y-1597 (Wild Weasel) was completed as a dry hole on November 9, 1993 at a location approximately 7 miles to the south south-west of Kuvlum #1. The well was plugged based on log analysis.

Western Colville Delta Area Evaluation Still Ongoing

Following the 1992 Fiord and Kalubik discoveries, ARCO and Union Texas Petroleum are continuing their evaluation of the Colville Delta area of the North Slope. Fiord #1 tested an average flow rate of 1,065 barrels of oil per day of 32 degree API gravity from one interval and had an average flow rate of 180 barrels of oil per day of 26 degree API gravity oil after hydraulic fracturing from a second interval. Kalubik #1 flowed at an average rate of 1,200 barrels of oil per day of 26 degree API gravity oil. A second interval, after hydraulic fracturing, had an average flow rate of 410 barrels of oil per day of 21 degree API gravity. During 1993 ARCO drilled three exploration wells in the area, Till #1, Colville River #1, and Kuukpik #3. During 1994 ARCO drilled two additional wells, Bergshrund #1 and Fiord #2. No details have been released on the results of these five wells. ARCO has announced five additional Colville Delta area prospects and plans to drill two of these locations in 1995. The Alpine #1 is just underway at the time of this writing.

Further Evaluation of the Badami Discovery Planned for 1995

BP has announced plans to drill up to two delineation wells on the 1990 Badami discovery. The Conoco Badami #1 discovery well was drilled from an onshore surface location to an offshore bottom-hole location in Mikkelsen Bay, about 25 miles east of Prudhoe Bay field. The discovery well flowed oil at a sustained rate of 4,250 bbls per day, and 1.2 million cubic feet per day of gas through a 24/64-inch choke, apparently from the Seabee Formation. A second well, the Conoco Badami #2, drilled in 1992 at a location four miles to the northwest of the discovery, also tested oil. BP acquired Conoco's interest in the Badami property in an exchange of assets in 1993.

BP has stated that the Badami prospect could contain up to 100 million bbls of recoverable oil and 100 billion cubic ft of gas and plans to drill up to two delineation wells in 1995. Badami is located about 36 miles from Pump Station No. 1 and approximately 20 miles southeast of production in the BP operated Endicott field. At the time of this writing, the first of two planned 1995 delineation wells, Badami #5, is just underway.

Other 1993-1994 Exploration Wells

Seven other exploration wells were drilled on the North Slope in 1993-1994. In 1993, the ARCO Jones Island #1, ARCO Tulaga #1, and the Exxon Thetis Island #1, were drilled on state leases, and the ARCO Big Bend #1 was drilled on Arctic Slope Regional Corporation land. In 1994, the BP Yukon Gold #1, UNOCAL Amethyst State #1 and Amerada Hess Northstar #3 were completed on state leases. No details have been released on the results of these seven wells.

State Funded Coalbed Methane Evaluation Corehole Drilled in the Northern Cook Inlet Basin

In 1994, the State of Alaska funded a 1,245 ft deep core hole to sample Tyonek Formation coals from northern Cook Inlet Basin. This analysis program was designed and run by the Division of Oil and Gas for the purpose of the acquiring key baseline information on the prospectivity of Alaska's abundant subsurface coal resources for coalbed methane production. The core hole (AK-94CBM-1) was drilled between the towns of Palmer and Houston and near roads and gas pipelines. Due to cost constraints, the drilling program was designed solely to acquire coal samples for analysis from relatively shallow depths. Results from analysis of the sampled coal indicate that the tested Tyonek coals have good potential for coalbed methane production and are similar in character and quality to those which are currently being produced for gas in the western US.

New Production and Field Expansion

Point McIntyre Field Production Start-Up

Production was initiated from the Point McIntyre Field on October 13, 1993. The Point McIntyre field was discovered in 1989 and is located at the northern edge of the Prudhoe Bay Unit. The field currently contains 41 wells and ultimately an additional 19-39 development wells are planned. As of November 1994 the field had produced approximately 41 million barrels of oil, and is currently producing at a rate of 119,000 bbl. of oil per day. It is anticipated that the field will produce at an average production rate of 110,000-115,000 barrels of oil per day through 1995. Point McIntyre oil is processed through the Lisburne Production Center. The field had an initial estimated 307 million barrels of recoverable oil in the Kuparuk River Formation and is owned by ARCO, Exxon, and BP.

Milne Point Field Expansion

Milne Point field was discovered by Conoco in 1969 and produces at an average daily rate of about 20,000 barrels from the shallow Schrader Bluff sand and deeper Kuparuk sand intervals. In 1993 BP acquired all of Conoco's Alaskan assets, including a 64-percent interest in Milne Point and its related facilities. In a separate deal BP acquired Chevron's 27-percent interest in the field for a total interest of 91-percent. Occidental holds the remaining 9-percent.

The field covers about 71,000 acres and contains about 41 producers and 21 injection wells. BP has begun a major development project at Milne involving a \$30 million facilities upgrade designed to increase production capacity from 30,000 to 50,000 barrels per day. BP anticipates that a 10-well development drilling program will be completed in the Milne Point Unit by year end. The goal is to raise the daily production to about 50,000 barrels by 1997. The development and expansion project will involve bringing accumulations at Cascade and NW Milne Point on line, as well as additional production from the Schrader Bluff.

Niakuk Field Begins Initial Production

Production began from BP's (100%) Niakuk field on April 12, 1994. The field was discovered in 1985 and contains about 54 million barrels of recoverable oil. The field is being directionally drilled from a development pad at Heald Point, northeast of Prudhoe Bay. Published production figures (November, 1994) indicate that production is averaging 8700 barrels of oil per day. BP expects to ramp up production to about 25,000 barrels per day at peak production from about 14 wells in mid-1995. ARCO plans to drill a 1995 delineation well to the west of the Niakuk Participating Area in an effort to determine if the pool extends onto ARCO owned acreage.

North Prudhoe Bay #3 and West Beach #4 Production

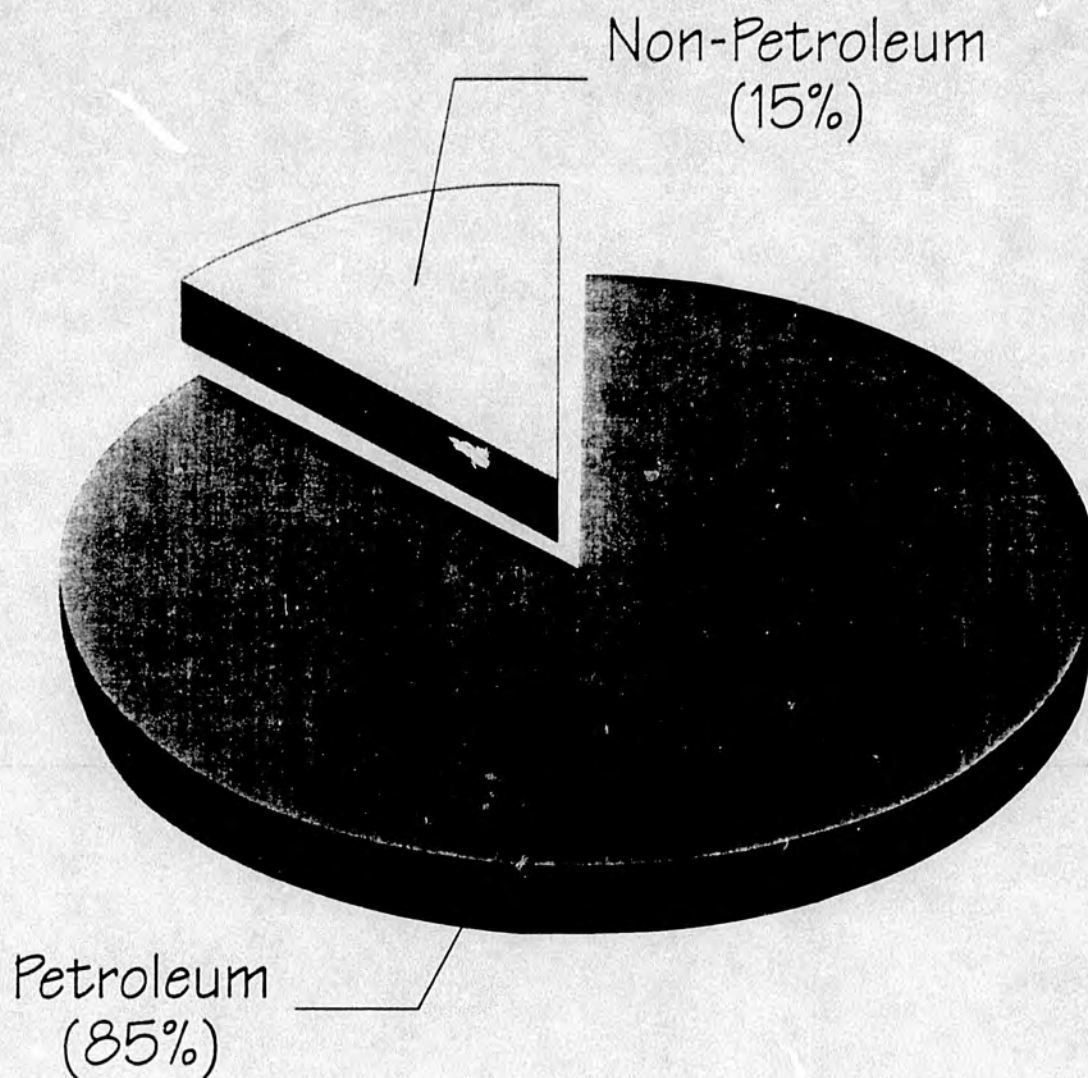
Two, single well production, oil accumulations began producing oil in 1993-1994. Both wells, North Prudhoe Bay #3 and West Beach #4 are located within the Prudhoe Bay Unit. ARCO North Prudhoe Bay State No. 3 was completed on April 15, 1993 and as of November 1994 the well was producing approximately 3,300 bbl of oil per day from the Ivishak Formation. The surface location of the well is on the West Beach drilling pad, from which ARCO also drilled West Beach #4. West Beach #4 began production from the Kuparuk Formation in April 1993 and, as of October 1994, was producing approximately 1,500 bbl of oil per day. ARCO and Exxon each hold a 50-percent interest in North Prudhoe and West Beach.

ARCO estimates the North Prudhoe Ivishak accumulation to be comparable in size to the West Beach Kuparuk accumulation, which contains about 10-65 million barrels of recoverable oil and 10-56 billion cubic feet of gas. Production is being commingled with oil from Point McIntyre, Niakuk and West Beach, and processed through the Lisburne Production Facility.

BP Purchases Majority Interest in the Northstar Unit

In early 1995 BP acquired an 81% interest in the North Slope's Northstar Unit from Amerada Hess. The purchase price was not disclosed. The company is currently negotiating with Shell Western E&P Inc. and Murphy Exploration to obtain the remaining 19% outstanding interest. The Northstar Unit is located approximately 10 miles east of the Milne Point Field. BP estimates that the Northstar Unit contains 100-200 million barrels of recoverable oil. The unit contains six wells, four of which are considered by BP to be commercially viable. Within the unit, oil is present both within the Kuparuk and Sadlerochit formations.

Where Our Money Comes From



Major Sources of Income (FY94):

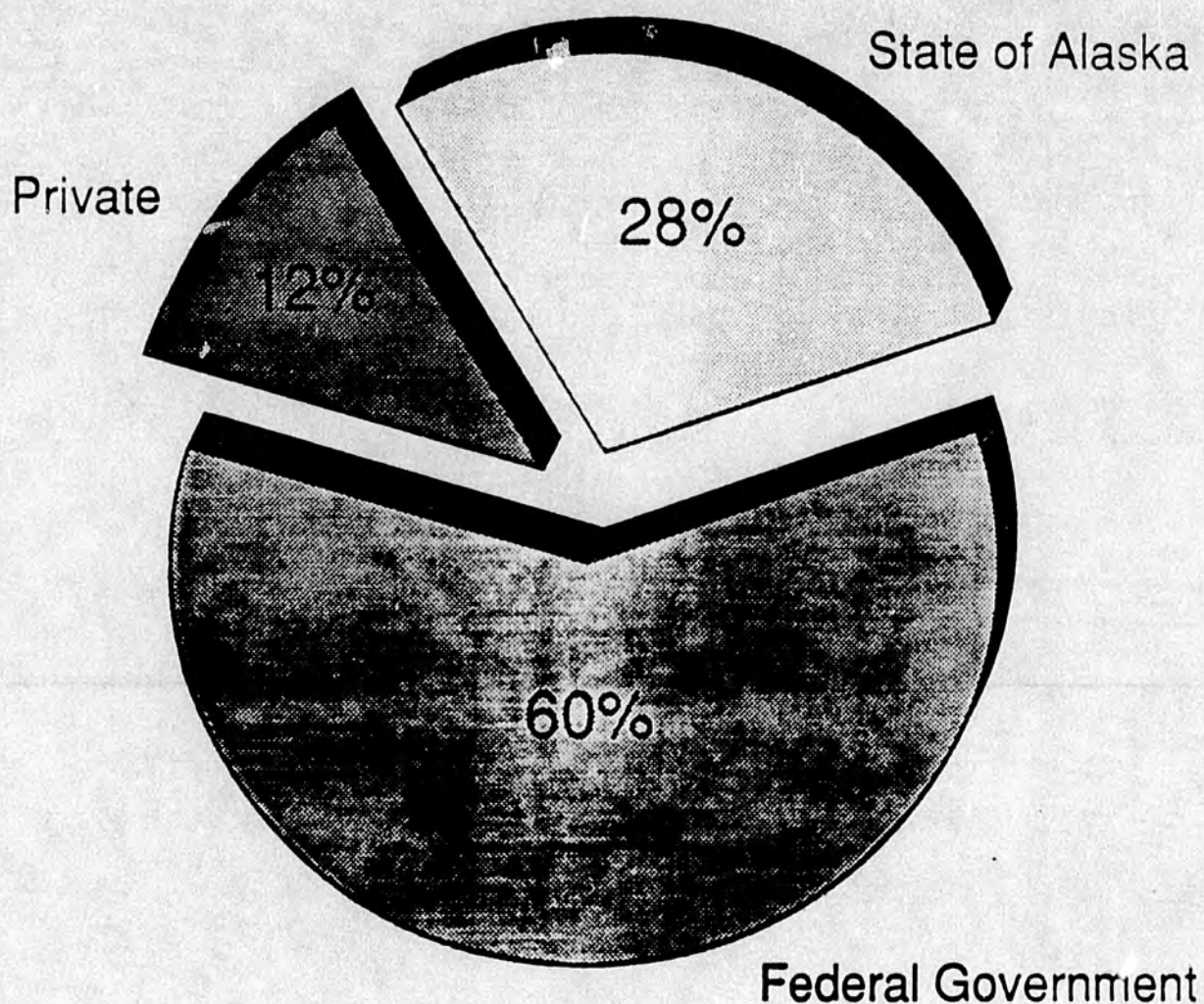
BONUS:	\$1.2 Million
RENTS:	\$7.8 Million
ROYALTIES:	\$696 Million
TAXES:	\$727 Million

ALASKA:

586,000 square miles

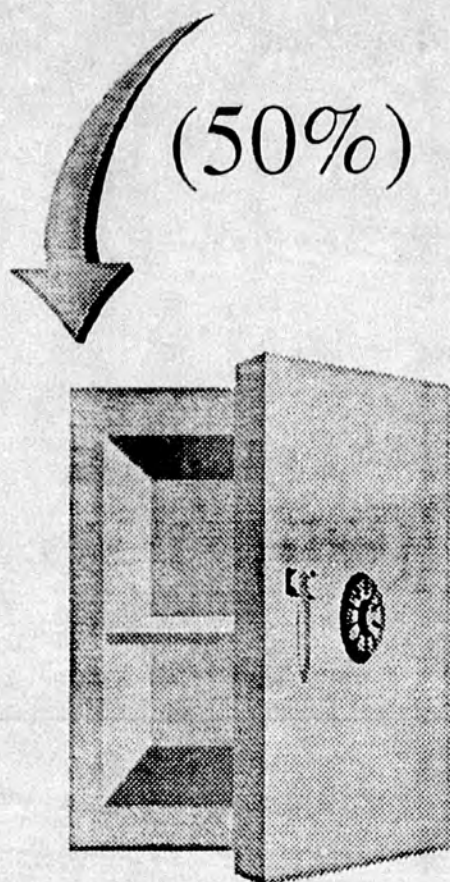
1.52 million square kilometers

375 million acres



Majority of known petroleum reserves are on state-owned lands
About 25% of proven U.S. oil reserves are located in Alaska

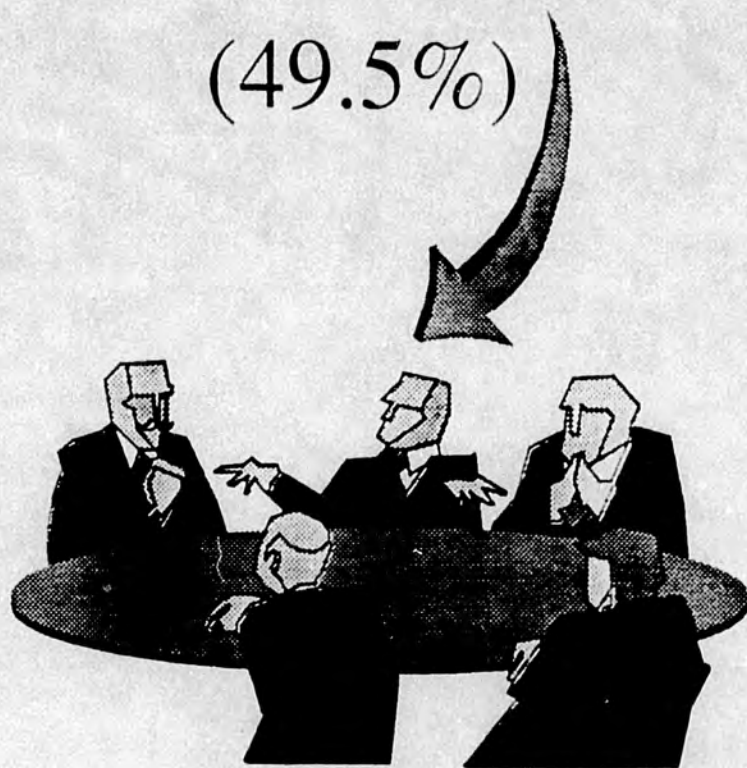
Where Our Money Goes



(50%)

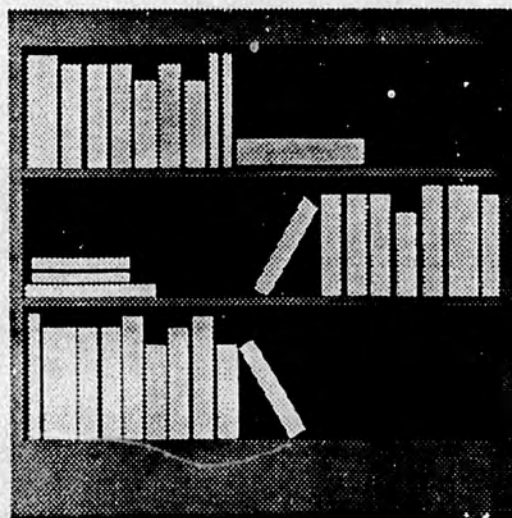
Permanent Fund
(Savings)

Schools



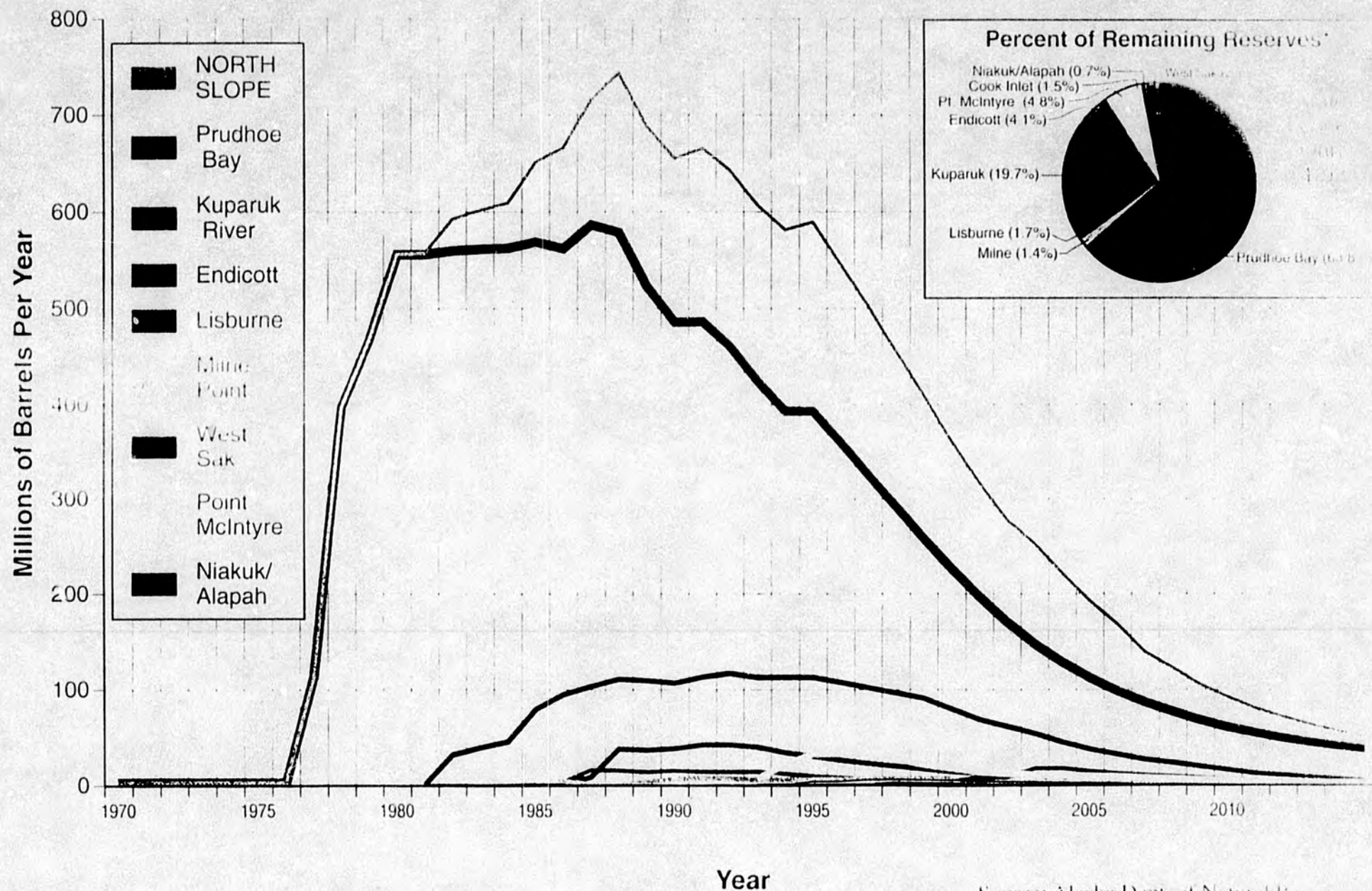
(49.5%)

General Fund
(Spending)

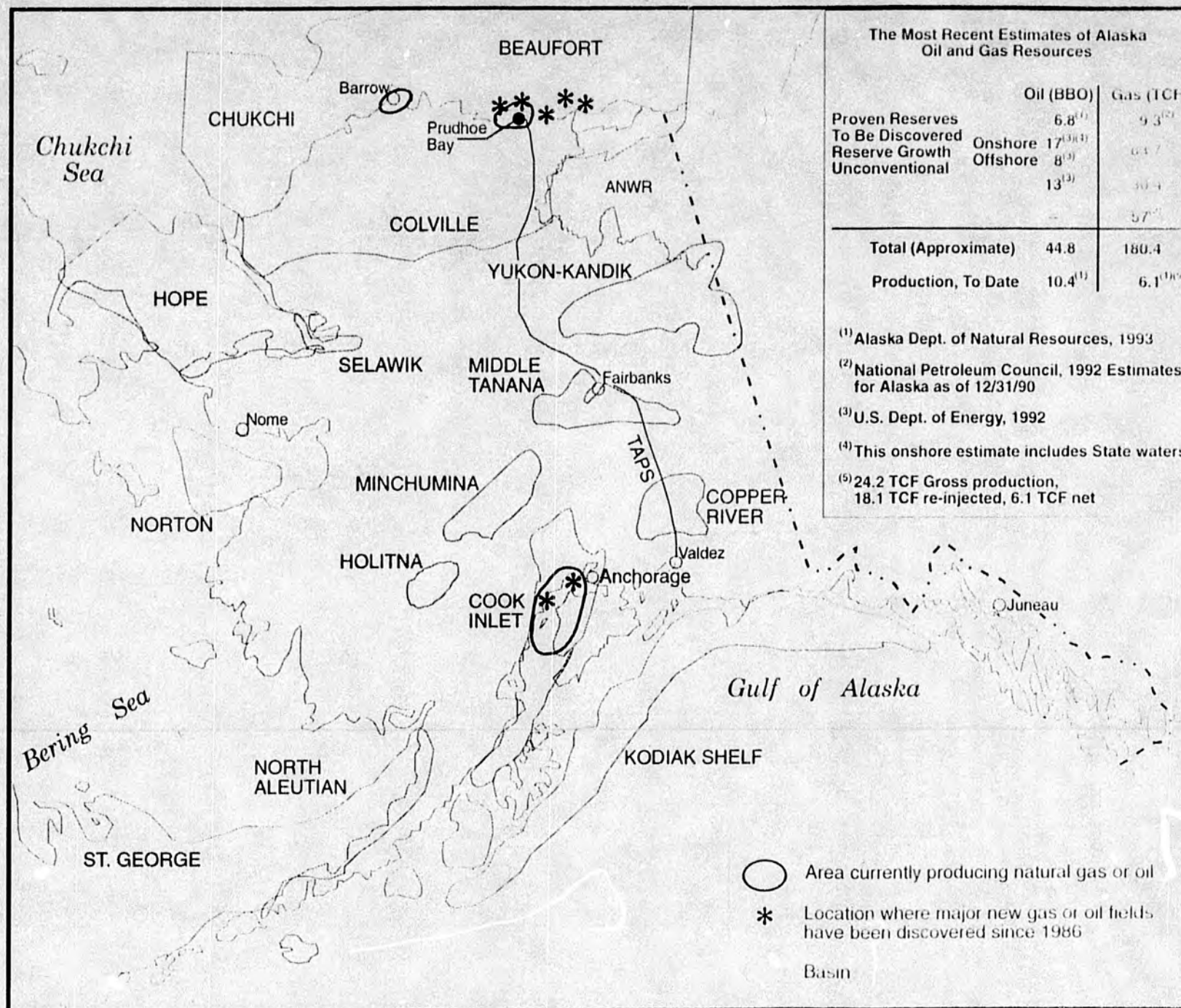


(.5%)

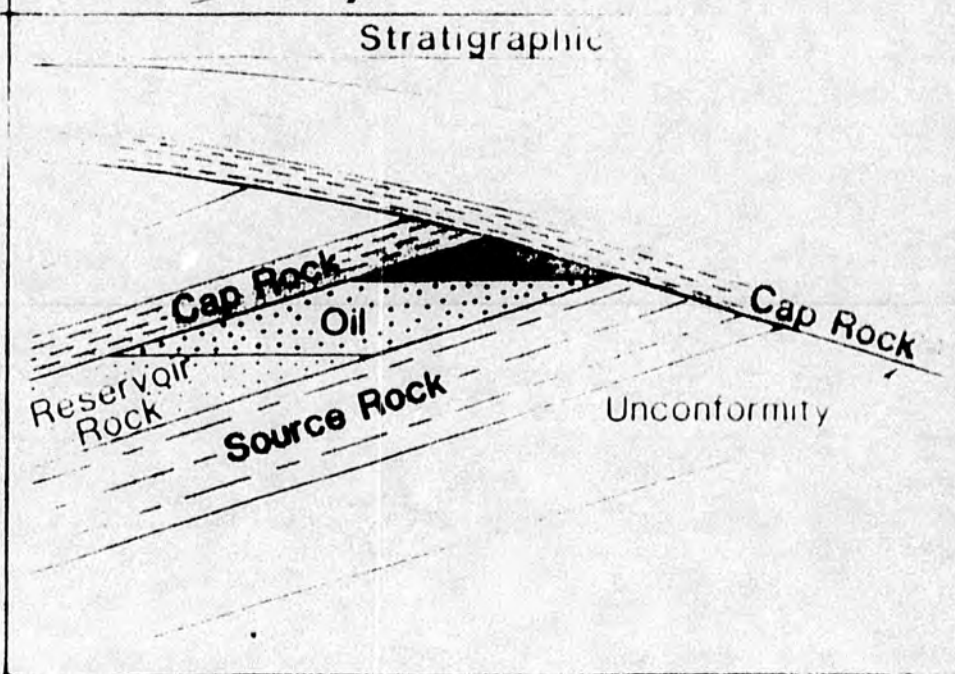
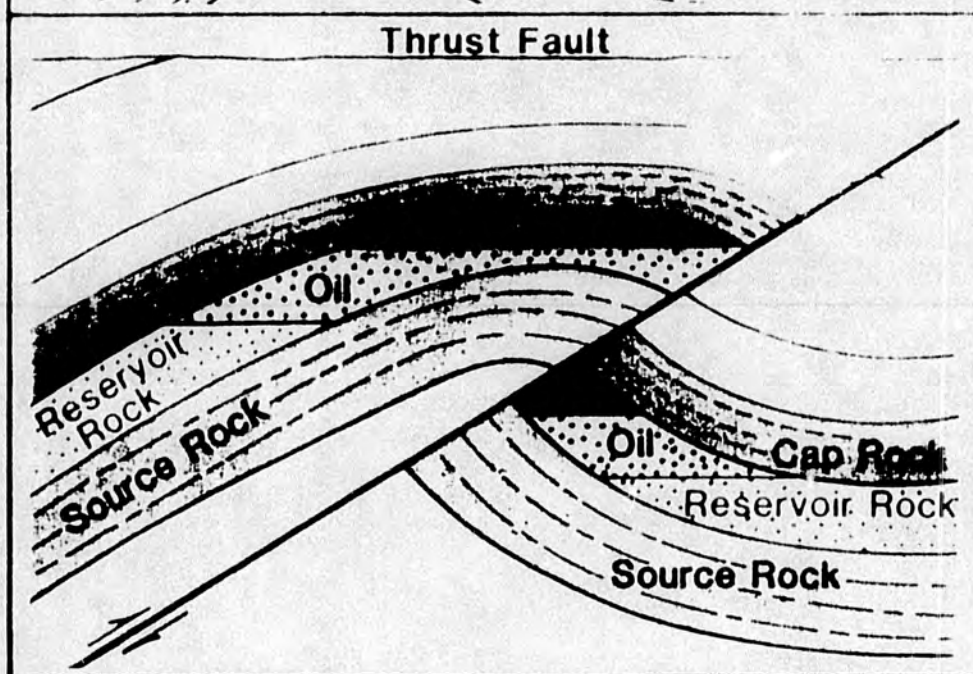
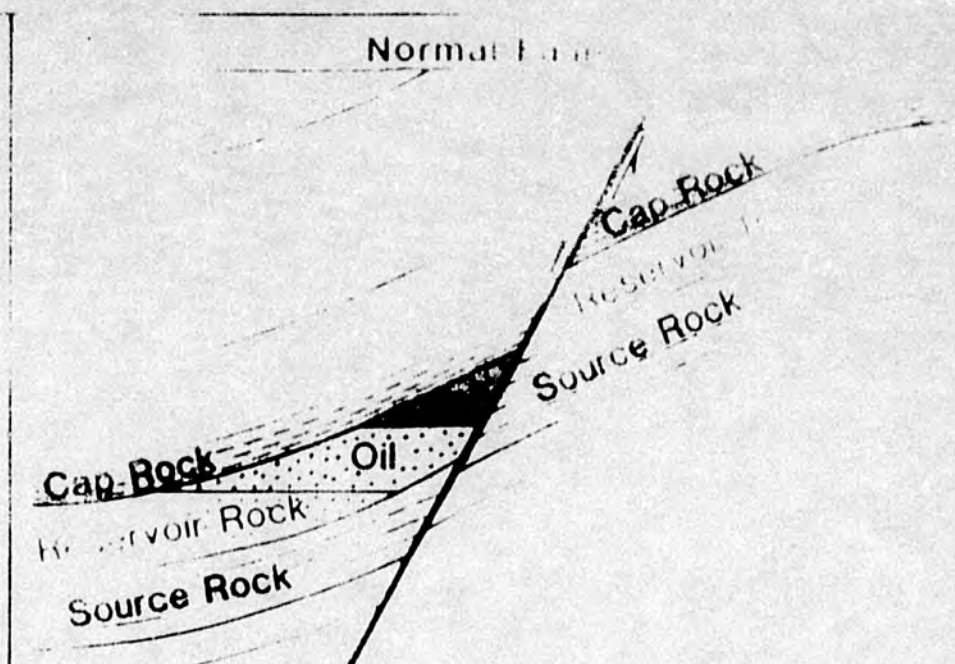
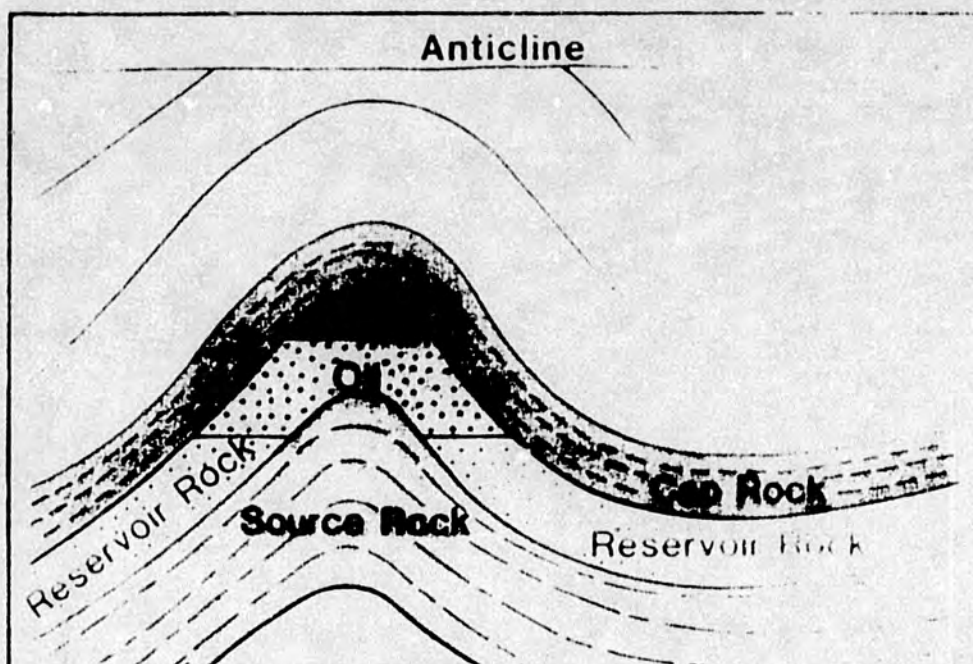
North Slope Historical & Projected Oil Production



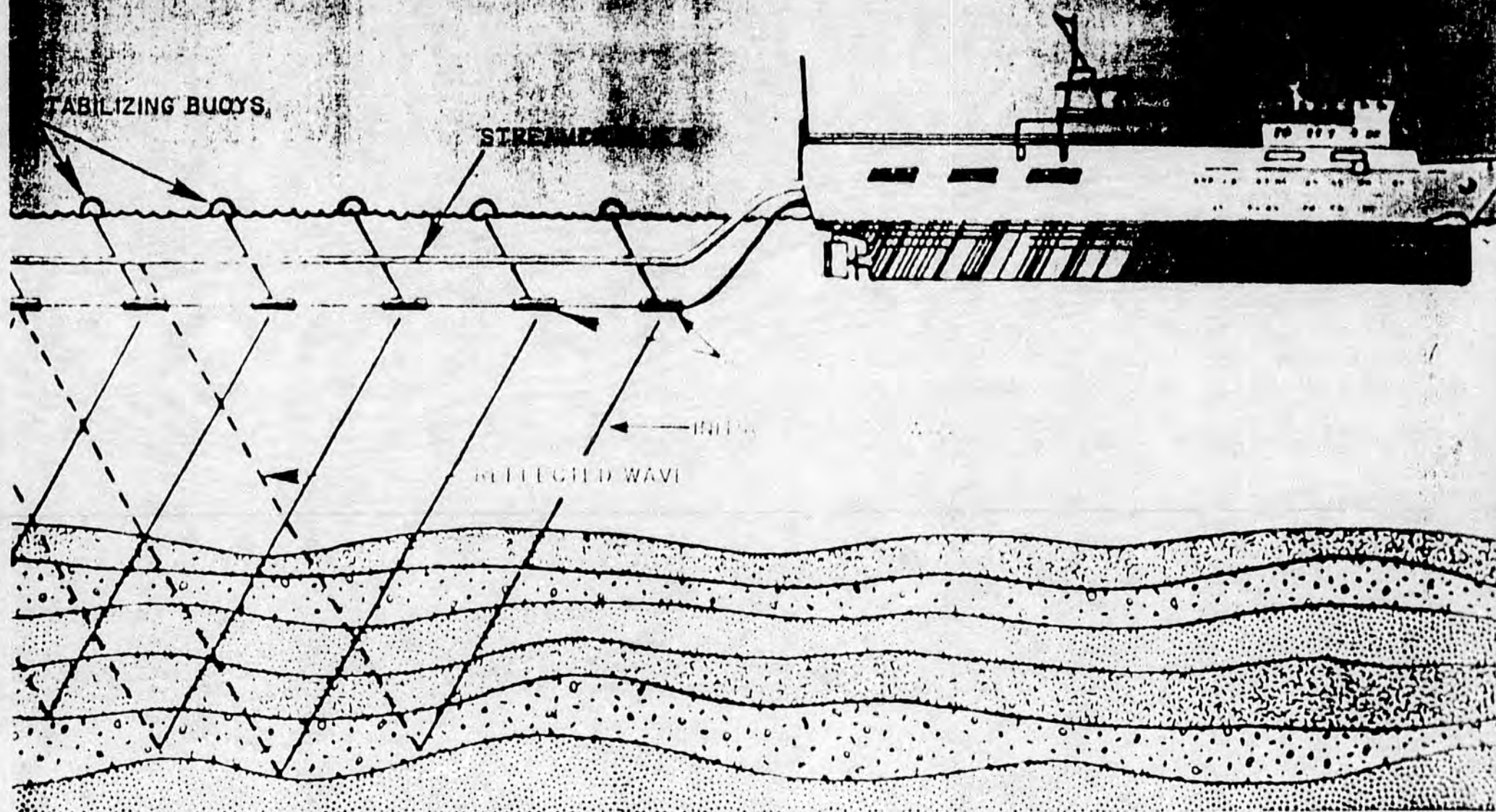
Source: Alaska Dept. of Natural Resources
Div. of Oil & Gas January 20, 1997



TRAPPING MECHANISMS

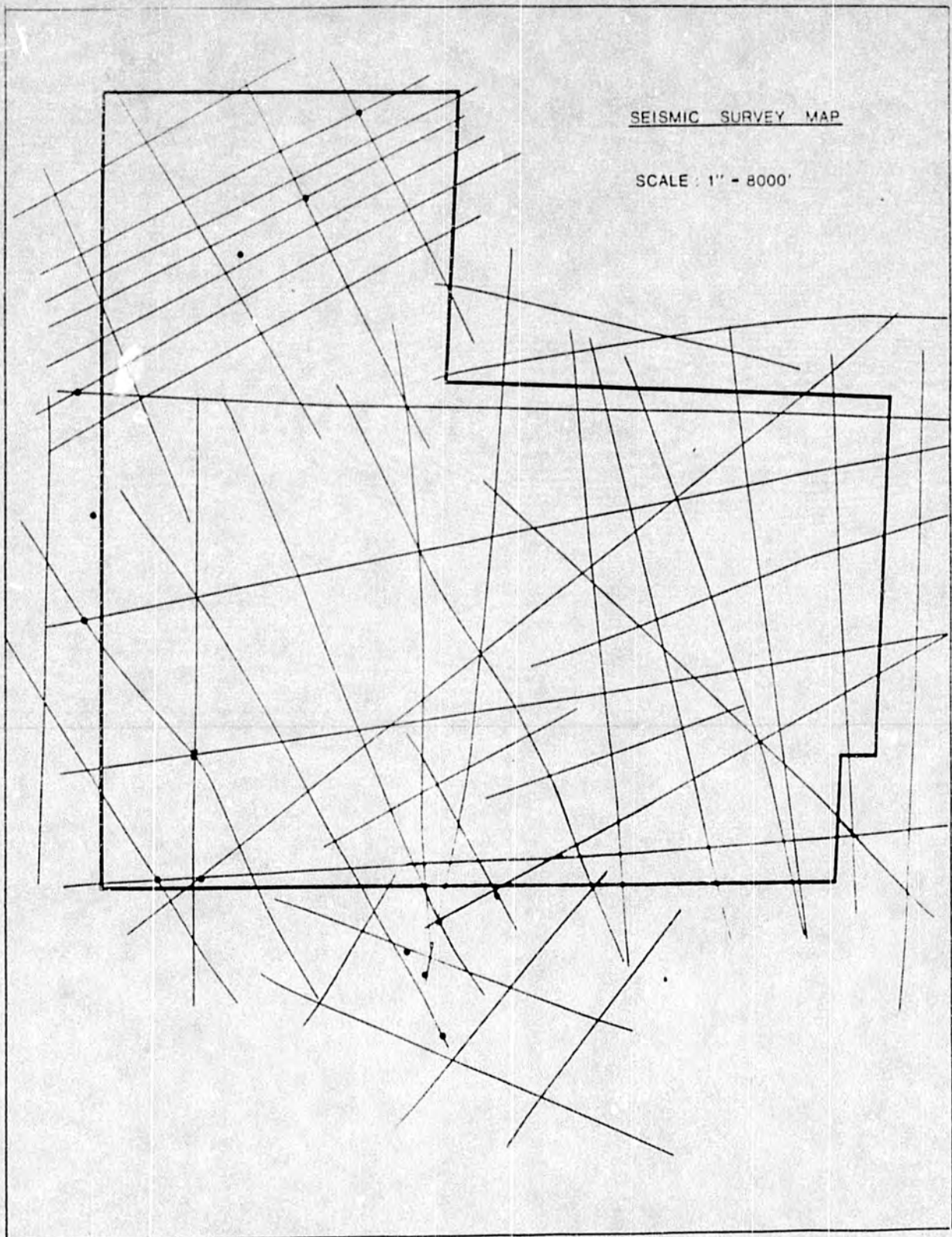


MARINE SURVEY

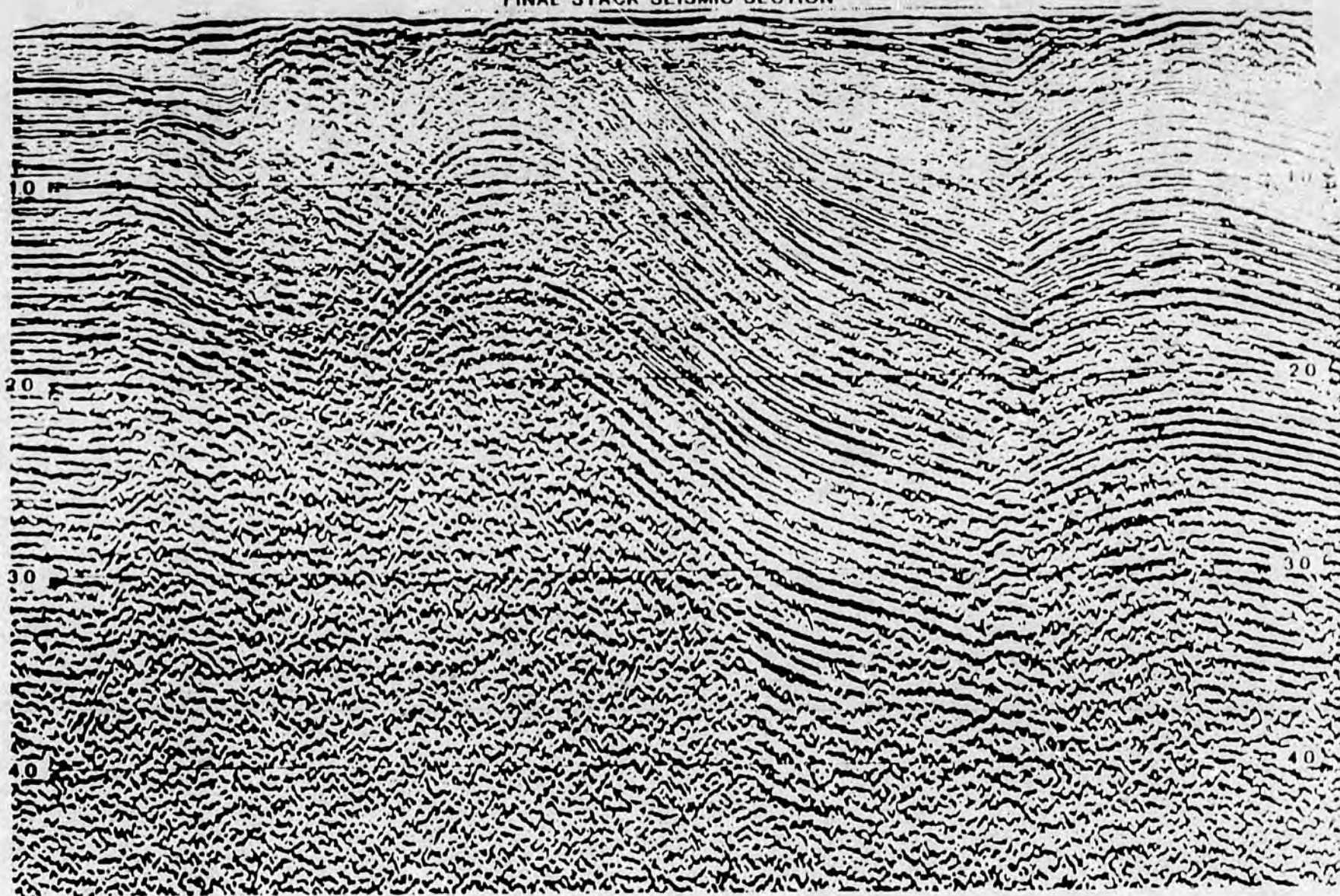


SEISMIC SURVEY MAP

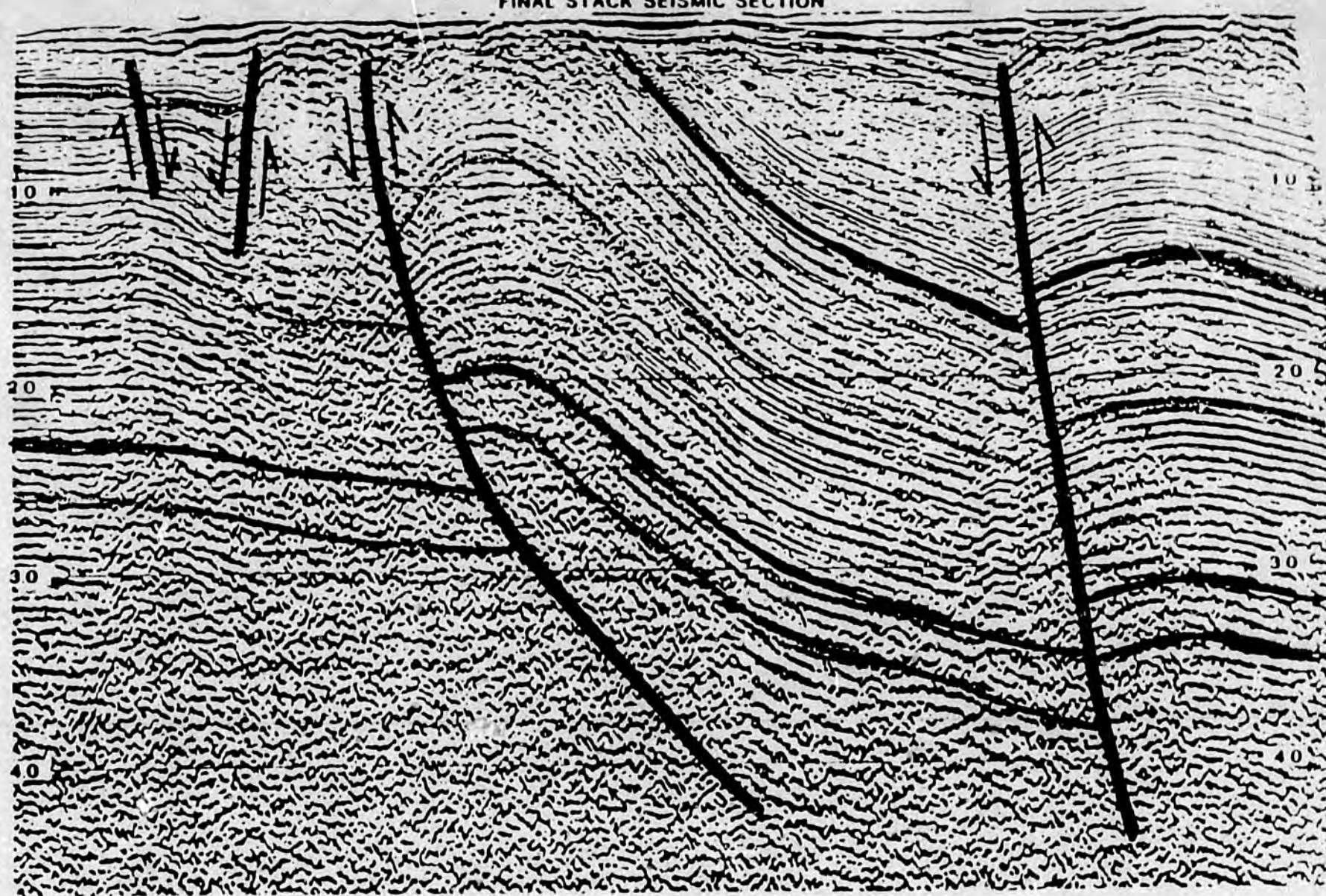
SCALE : 1" = 8000'



FINAL STACK SEISMIC SECTION



FINAL STACK SEISMIC SECTION

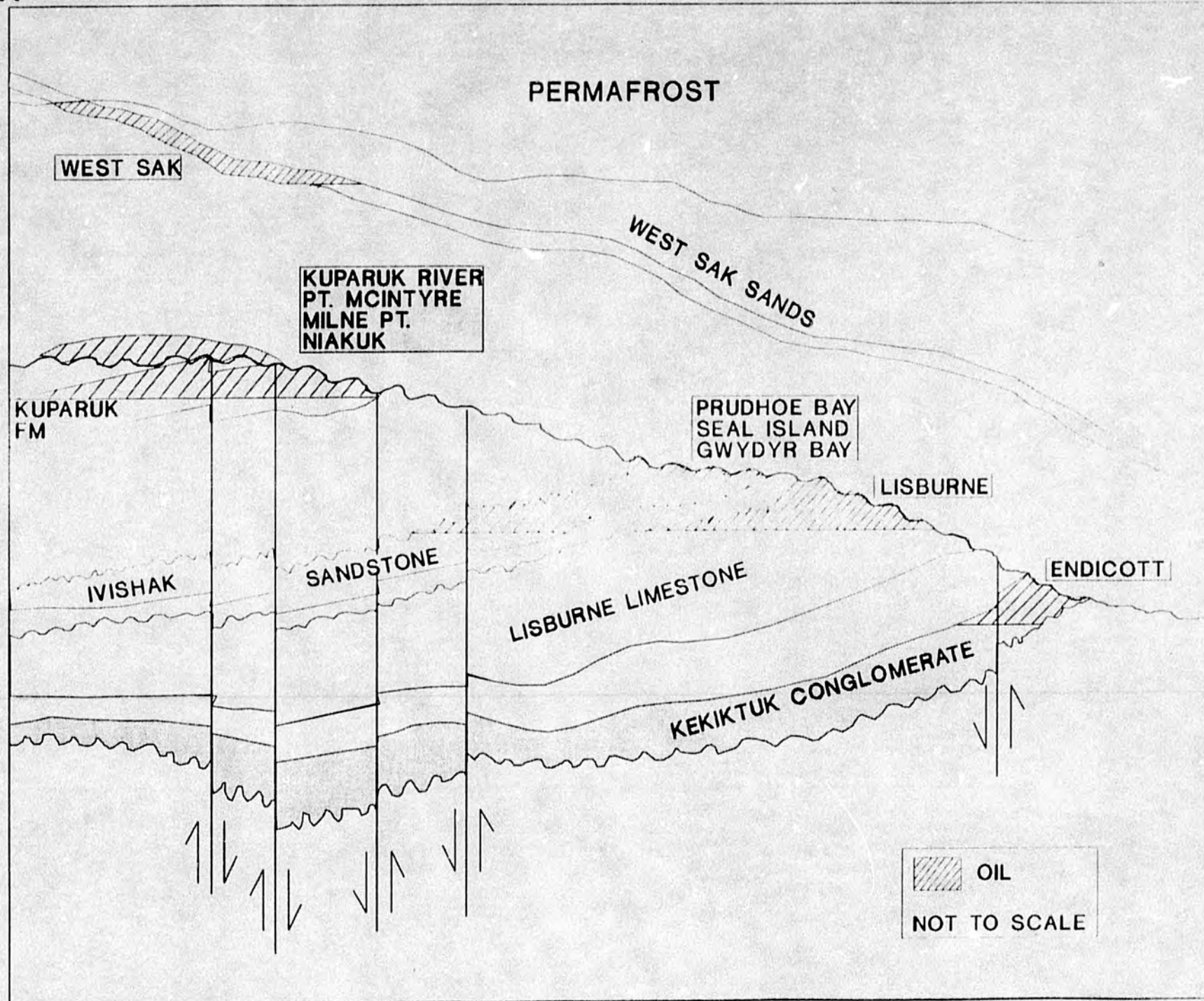


SEISMIC DEPTH MAP
TOP HORIZON 'B'
CONTOUR INTERVAL — 1000 FEET
SCALE : 1" = 8000'

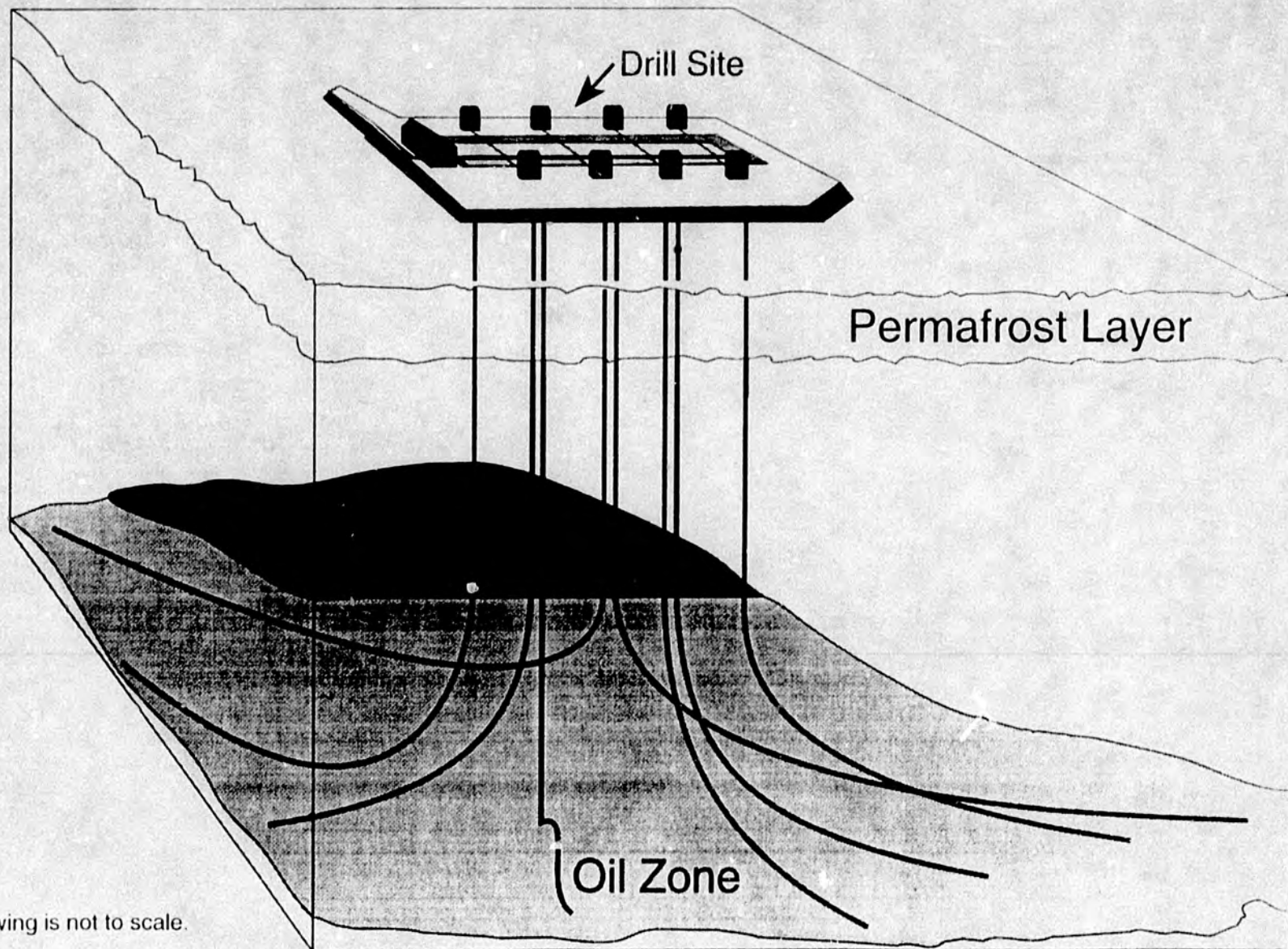
W

NORTH SLOPE OIL FIELDS

E



Drill Site Block Diagram



Drawing is not to scale.

PRIMARY PRODUCING OIL FIELDS
NORTHERN ALASKA (Feb. 1994)

NAME DISC. DATE	PROJECTED AVE. DLY. PROD. 1994 Mbbls/d	CUMULATIVE PRODUCTION Thru '93 MMbbls	+ REMAINING RESERVES As of 1/94 MMbbls	= EST. ULTIMATE RECOVERY As of 1/94 MMbbls	EST. % DEPLETED As of 1/94
Prudhoe Bay 1967	1,078	8,307	3,618	11,925	70 %
Kuparuk River 1969	315	1,070	1,142	2,212	48 %
Endicott 1978	100	237	262	499	47 %
Point McIntyre 1988	90	2	356	358	0 %

Note: Primary means greater than 50 Mbbls/d projected
Numbers reflect oil + NGLs - injectant

OTHER PRODUCING OIL FIELDS

NORTHERN ALASKA (Feb. 1994)

NAME DISC. DATE	PROJECTED AVE. DLY. PROD. 1994 Mbbbls/d	CUMULATIVE PRODUCTION Thru '93 MMbbls	+ REMAINING RESERVES As of 1/94 MMbbls	= EST. ULTIMATE RECOVERY As of 1/94 MMbbls	EST. % DEPLETED As of 1/94
Lisburne 1967	24	98	83	181	54 %
Milne Point * 1969	20	34	81	115	30 %
Niakuk/Alapah 1985	10	0	55	55	0 %
Other Prudhoe ** 1976	6	1	25	26	4 %

Note: Fields with less than 50 Mbbbls/d proj. prod. (oil + NGLs - Inj.)

* Includes Schrader Bluff

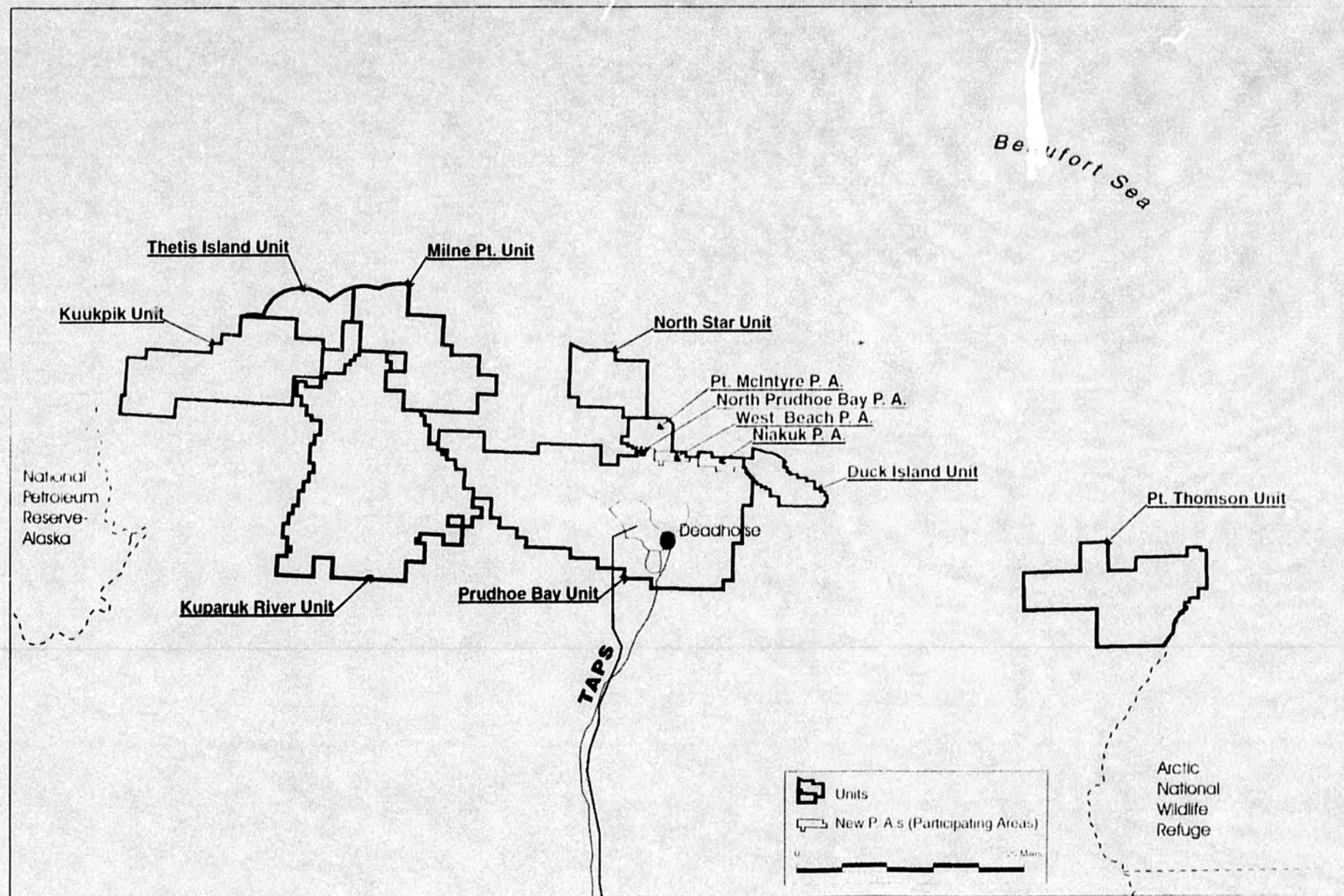
** West Beach & North Prudhoe

UNDEVELOPED OIL ACCUMULATIONS

NORTHERN ALASKA (Feb. 1995)

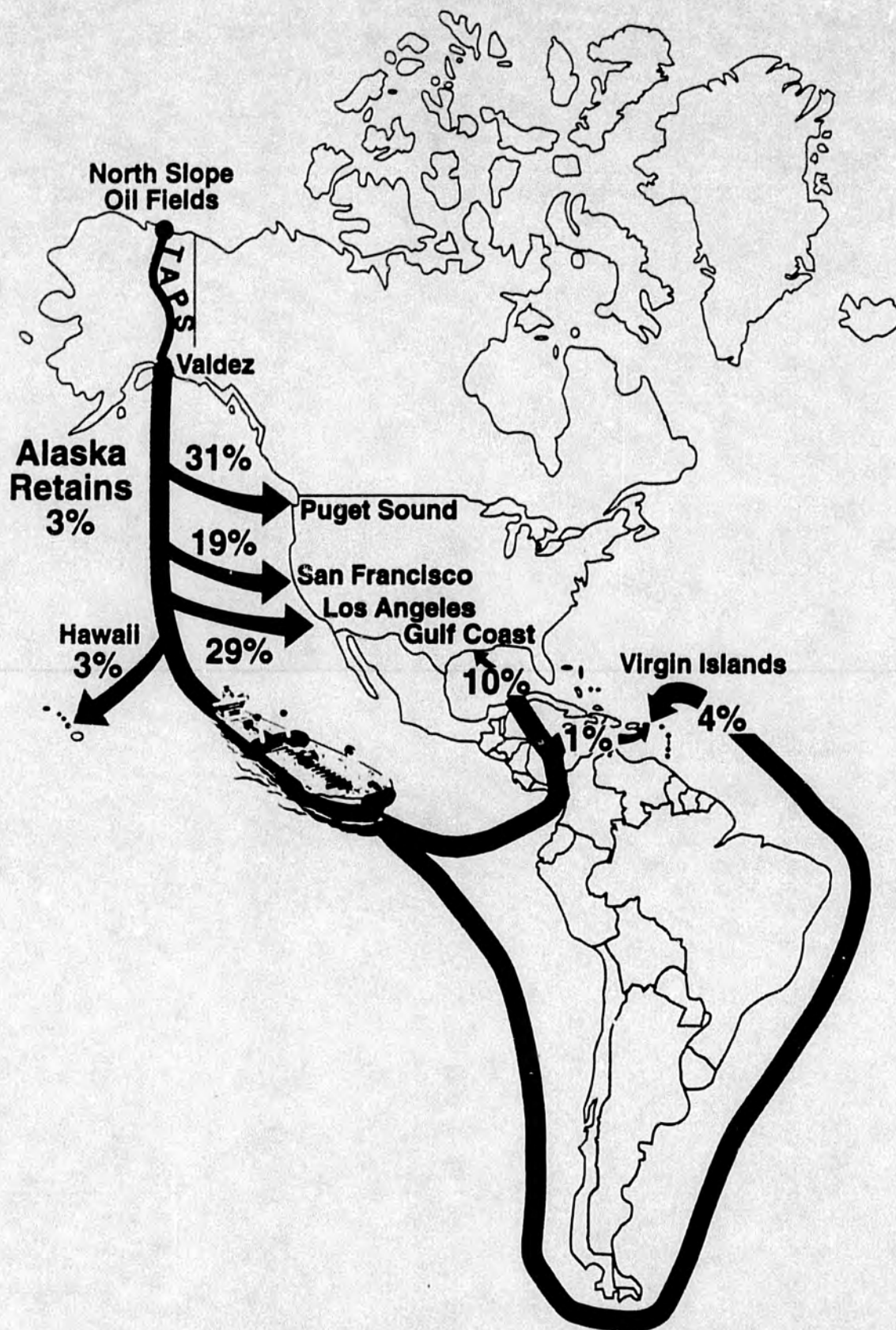
NAME DISC. DATE	EST. RECOVERABLE RESERVES	COMMENTS
West Sak 1969	147 MMBO	Heavy oil
Flaxman Island 1975	? OIL	Tertiary Turbidites
Point Thomson 1977	200 MMBO 3.5 TCFG	Gas/Condensate
Northstar 1984	180 MMBO	Beaufort Sea Incl Seal Is.
Colville Delta 1985	? OIL	West of Kuparuk
Fiord 1992	? OIL	1245 bopd
Kalubik 1992	? OIL	1610 bopd
Hammerhead 1986	? OIL	OCS waters No. of Pt Thom
Badami 1990	? OIL	4250 bopd
Kuvlum 1992	? OIL	E. Beaufort OCS 3400 bopd
Cascade 1993	? OIL	Near Milne Pt 1720 bopd
Sourdough 1994	? ?	Cert. Paying Quantities

Oil and Gas Units in Northern Alaska



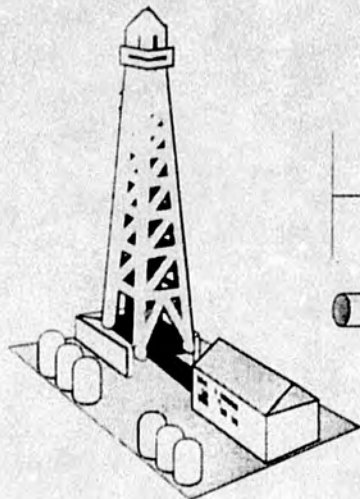
Alaska North Slope Crude Oil Destinations (August 1992)

Average Volume $\approx$ 1.7 Million Barrels/Day

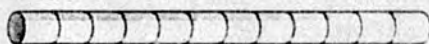


OIL PRICE DEDUCTIONS

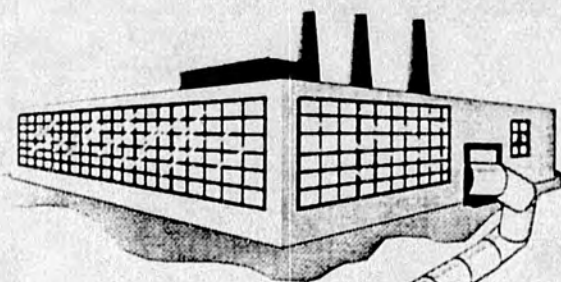
Wellhead



83¢ / BBL
Field Cost

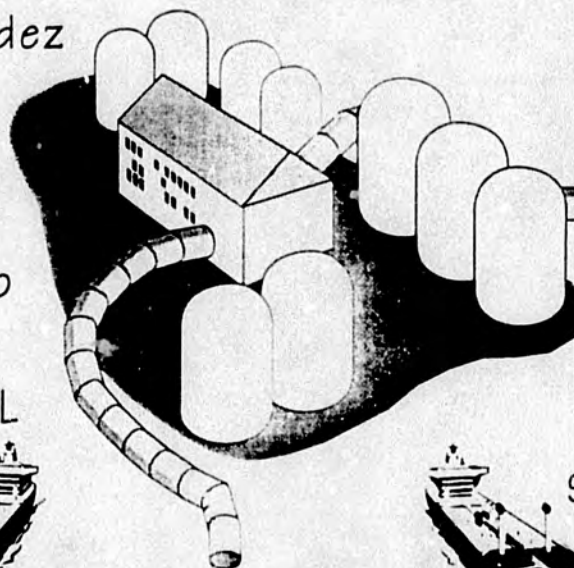


Pump Station #1



TAPS Tariff =
\$3.61 / BBL

Valdez



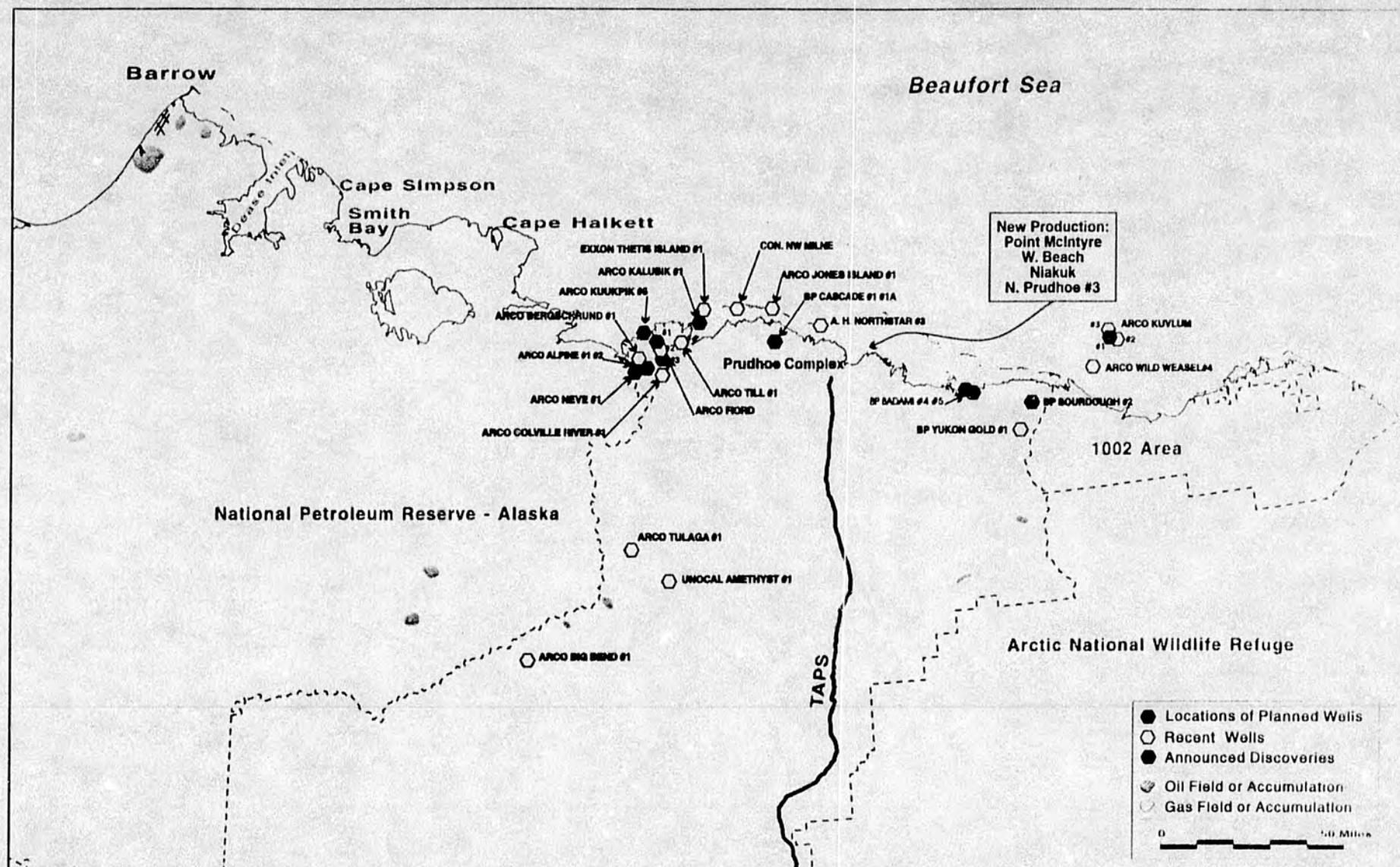
Transportation to
West Coast =
\$1.00 - \$1.50 / BBL



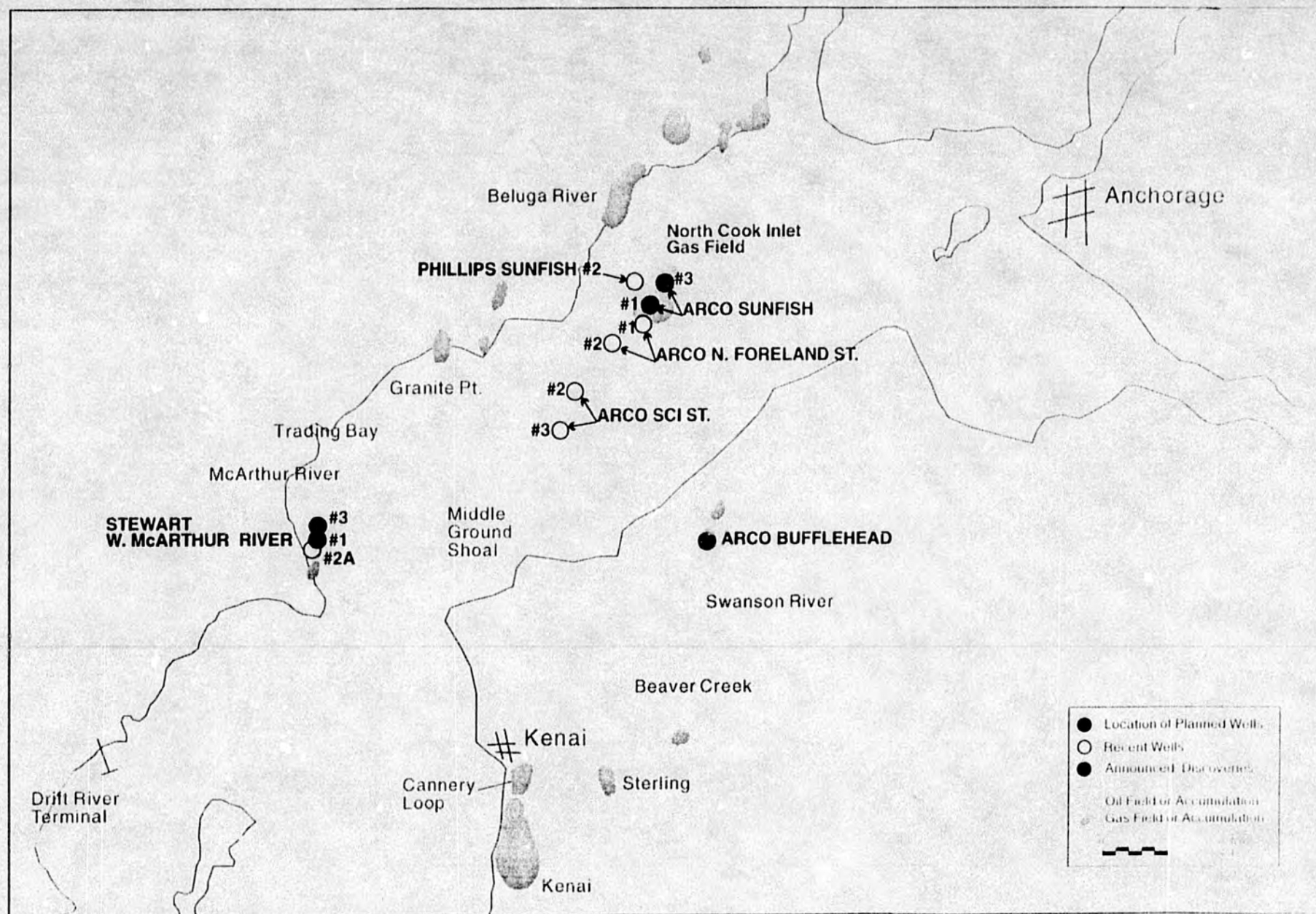
Transportation to
Gulf Coast =
\$4.25 - \$5.50 / BBL



Recent Oil and Gas Activity in Northern Alaska



Recent Oil and Gas Activity in Cook Inlet



	1998 SALTS	
79	Cape Yakutat	9.9
CTR	Cook Inlet Reentry	10.9
80	Shaynovik	11.9

85A	1996 SALT Cook Inlet Exempt	9.9%
-----	--------------------------------	------

86	1997 SALES Central Beaufort Sea	49
----	------------------------------------	----

	1998 SALES	
87	North Slope	3.9%
85	Cook Inlet / Kamishak Bay	8.9%

	1999 SALES	
83	Western Beaufort Sea	3.99
89	Central & Eastern Beaufort Sea	12.99

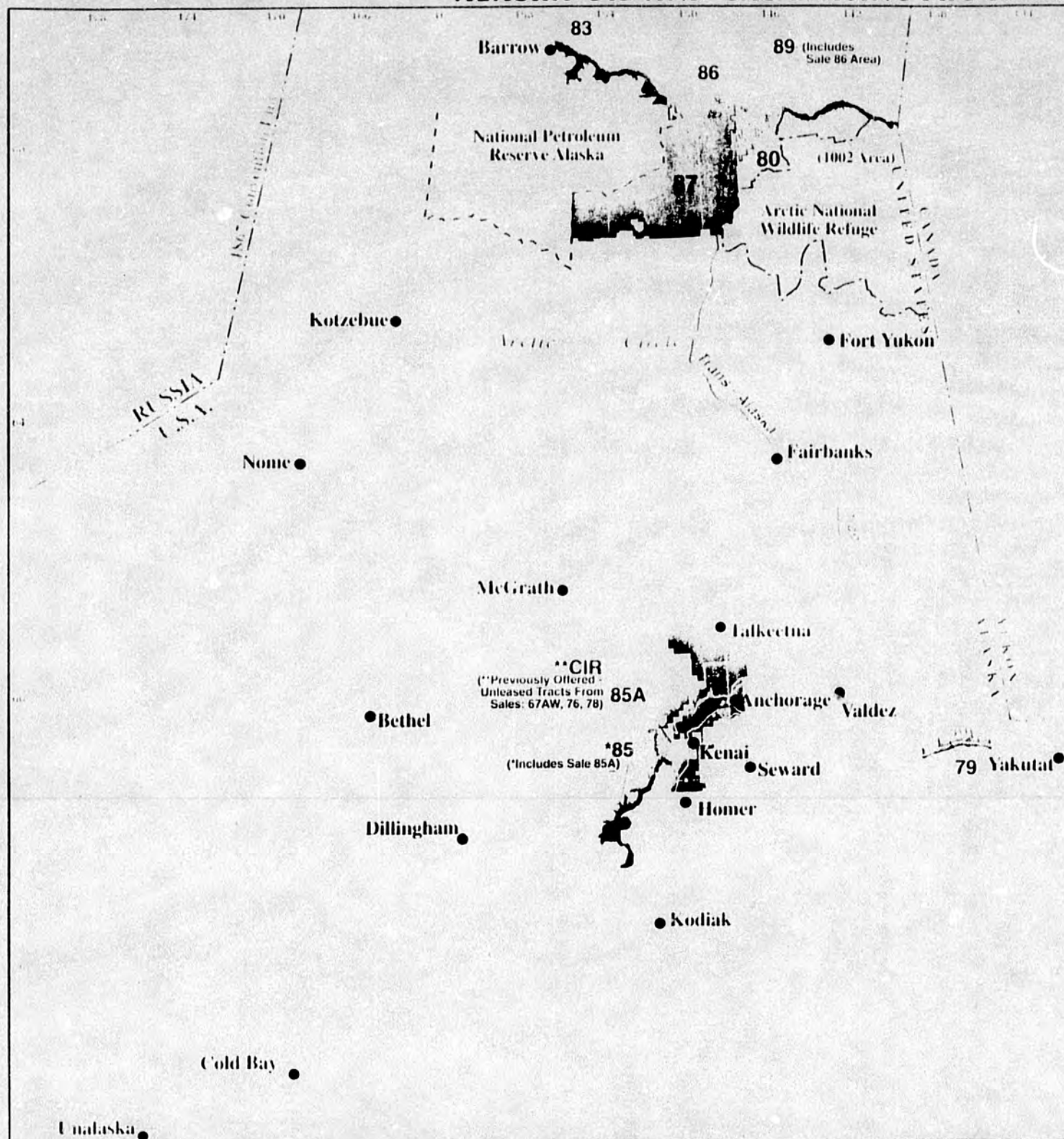
Wassiliadis, D. and P. J. Williams, 1999. The evolution of the stellar initial mass function. *Mon. Not. R. Astr. Soc.* 307: 91-104.

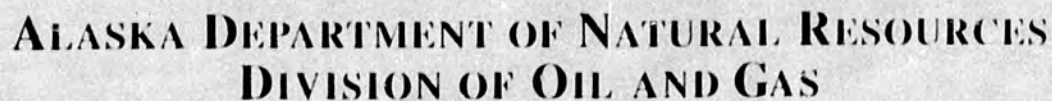
Juncan ★

Sitka ●

Petersburg

ketchikan●



[Public Meetings may be held at any time]

Oil and Gas Exploration License

I. PURPOSE

- To supplement conventional oil and gas lease sales.
- Encourage competitive exploration for oil and gas on certain state lands.

II. THE STATE GRANTS

- The exclusive right to explore, for up to 10 years, designated tracts of not less than 10,000 acres nor larger than 500,000 acres, limited to 2 million acres per licensee.
- Option to convert license areas to standard leases.

III. THE LICENSEE ACCEPTS

- An obligation to perform exploration work by bidding "direct exploration expenditures" which are subject to audit.
- The requirement to post a substantial performance bond.
- Relinquishment and termination provisions such that:
 - Must complete 25 percent of work commitment within 4 years or license is forfeited;
 - Must complete 50 percent of work commitment within 4 years or relinquishment provisions apply.

Exploration Incentive Credit

I. PURPOSE

- To supplement the existing exploration incentive credit program;
- Encourage exploration for oil and gas on all lands in the state.

II. THE STATE FOR 10 YEARS MAY GRANT

- Credits, up to \$5 million per project, that can be applied against royalties, taxes, and oil and gas bonus payments.
- Credits may be earned up to 50 percent of pre-approved eligible costs relating to activities on state-owned land and 25 percent of pre-approved eligible costs on other lands.
- The program continues until the 10 year term expires, or \$30 million in total has been expended.
- Amounts due the permanent fund are calculated before application of any credit.
- An applicant may not have any liquidated debt.

III. THE LICENSEE

- Conducts pre-approved geophysical work and/or exploration drilling.
- Provides all raw and processed data to the State.
- Must use the credit, which is assignable, within 5 years.

Eastern North Slope, Alaska

