

AOGCC Pool Statistics

Milne Point Unit, Sag River Oil Pool

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Operator: BP Exploration (Alaska) Inc.

Discovery Well: Standard Oil of California
Kavearak Pt #32-25
Permit #169-051
API No. 50-029-20028-00-00
Sec. 25, T13N, R10E, UM
Depth: 9,799' MD / 9,799' TVD
August 6, 1969

Status: **Producing**

Location: **Central Arctic Slope**

[Area Location Map](#)

[DNR Unit Map](#)

Orders: [Complete List](#)

Summary: The Sag River Oil Pool lies within the Milne Point Unit ("MPU"), and it is defined as the accumulation of hydrocarbons common to and correlating with the interval between the measured depths of 8,810' and 8,884' in the MPU A-01 well. Regular production from the pool began in 1995. Three wells and 3 sidetracked wellbores were drilled to develop the pool: 1 producer from MPU C-Pad, 1 sidetracked producer from MPU E-Pad, 3 wellbores from MPU F-Pad (1 producer, 1 sidetracked producer, and 1 sidetracked injector), and 1 producer from MPU K-Pad. Well spacing is approximately 40 acres. Since 2002, only 1 wellbore within the pool has been on production (MPU F-33A). Water-alternating-gas injection began in MPU F-73A during July 2002 in support of MPU F-33A, but was halted in May 2004. During 2004, monthly production from the pool averaged 173 barrels of oil per day, 109 thousand cubic feet of gas per day and 186 barrels of water per day.

Geology: Within the pool, the Sag River consists of late Triassic to early Jurassic-aged, thin marine shelf sediments. At Milne Point, the Sag River is divided into four laterally extensive sub-zones that are named, from deepest to shallowest, A through D. The zones are fairly uniform in thickness and have similar reservoir properties. Zone D is non-reservoir siltstone and shale at the top of the Sag River; its average gross thickness is about 21 feet. Zone C is the uppermost sandstone interval. It is generally non-reservoir with porosity to 17%, permeability to 2.9 millidarcies, and an average gross thickness of 10 feet. Zone B is the primary reservoir interval, with porosity to 21%, permeability to 23 millidarcies, and an average gross thickness of 30 feet. Zone A is the basal sandstone unit, which unconformably overlies the Shublik Formation. At Milne Point, it is composed almost entirely of non-reservoir sandstone, with porosity to 18%, permeability to 1.2 millidarcies, and an average gross thickness of about 16 feet. The moderate to good porosity and poor permeability observed in zones A through C are the result of bioturbation and diagenesis. The trapping mechanism observed in the pool is predominately structural, consisting of three-way anticlinal closures sealed against the downthrown side of faults, with throws generally greater than 50 feet. Within the MPU development area, an orthogonal fault pattern segments the oil accumulation into three known equilibration regions, with known oil-water contacts at 9,150', 9,050', and 8,950' true vertical depth subsea. Oil gravity in the Sag River is about 39 degrees API. Original oil in place ("OOIP") for the pool is estimated to be is about 62 million barrels.

[Strat Column](#)

Orig. Oil in Place: 62 MMSTB (CO 423 Order)

Production: [Prod Chart](#)

[Prod Report](#)

[Prod Data](#)

	Oil (bbls)	NGL (bbls)	Gas (mcf)	Water (bbls)
Cumulative	1,589,010	0	1,595,848	1,414,010
2001 Total	248,017	0	227,643	3,738
2002 Total	129,943	0	179,126	2,838

2003 Total	101,470	0	121,173	0
2004 Total	47,771	0	27,750	1,487
2003 Daily Rate	278	0	332	4
2004 Daily Rate	131	0	76	0
Change (%)	-53%	0	-77%	-

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Milne Point Unit, Sag River Oil Pool

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EOR Injection:

Chart

Report

Data

	Gas (Mcf)	Water
Cumulative	248,518	1,081,039
2001 Total	0	0
2002 Total	0	653,155
2003 Total	179,033	335,767
2004 Total	69,485	92,117
2003 Rate (per day)	491	920
2004 Rate (per day)	190	252
Change (%)	-61%	-73%

Disposal Injection in Field:

Disposed Fluids

Cumulative	
Cumulative	0
2001 Total	0
2002 Total	0
2003 Total	0
2004 Total	0
2003 Rate (per day)	0
2004 Rate (per day)	0
Change (%)	0

Field Development Information:

Wells In Field

Type Well	Status	2004	2003	2002	2001	2000
Producer	Oil Producer	218	200	182	168	145
Injector	Water Injector	67	63	53	46	46
	Gas Injector	1	1	1	1	1
	WAG Injector	37	37	36	32	27
	Water Supply	8	8	8	8	8
	Disposal	0	0	0	0	0
Non-Operating	OPR Shut Down	0	0	2	2	0
	Suspended	8	8	7	7	6
	Abandoned	47	47	42	38	32
Total		386	364	331	300	265

Active Completions in Pool (Month of December):

Type Well	Status	2004	2003	2002	2001	2000
Oil Producer	Flowing	0	0	0	0	0
	Gas Lift	0	0	0	1	0
	Pump	1	1	0	1	0
	Shut-In	1	1	2	1	3
Service Well	Water Injector	0	0	1	0	0
	Gas Injector	0	1	1	0	0
	WAG Injector	0	0	0	0	0
	Water Supply	0	0	0	0	0
	Shut-In	1	0	0	0	0
Disposal Undef.	Disposal Injector	1	0	0	0	0
	Shut-In	0	0	0	0	0
Total		3	3	3	3	3

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Permitted Wells in Pool:

Type Well	Status	2004	2003	2002	2001	2000
Development	New	0	0	0	0	0
	Sidetrack	0	0	0	1	1
	Multilateral	0	0	0	1	0
Service	New	0	0	0	0	0
	Sidetrack	0	0	0	0	0
	Multilateral	0	0	0	0	0
Exploration	New	0	0	0	0	0
	Sidetrack	0	0	0	0	0
Total		0	0	0	2	1

Reservoir Properties:

Description	2004	2003	2002	2001	2000
Reference Datum - ft. below sea level	8700	8700	8700	8700	8700
Temperature - ° F	234	234	234	234	234
Porosity - %	8-21	18	18	18	18
Permeability - md	.1-10	4	4	4	4
Swi - %	40	40	40	40	40
Oil Viscosity @ Orig. Press. cp	.28-.35	.28-.35	.28-.35	.28-.35	.28-.35
Oil Viscosity @ Sat. Press. cp	-	-	-	-	-
Orig. Press. - psi	3100	4425	4425	4425	4425
Bubble Point - psi	-	-	-	-	-
Current Reservoir Press. - psi	2722	2722	3000	3350	3350
Oil Gravity - ° API	39	39	39	39	39
Gas Specific Gravity (Air = 1.0)	.65	.65	.65	.65	.65
Gross Pay - ft.	77	77	77	77	77
Net Pay - ft.	22-36	30	30	30	30
Orig. FVF - RB/STB	1.41-1.56	1.41-1.56	1.41-1.56	1.41-1.56	1.41-1.56
Bubble Point FVF - RB/STB	-	-	-	-	-
Orig. GOR - SCF/STB	784-974	784-974	784-974	784-974	784-974
GOR (current yr.) - SCF/STB	581	1194	1379	887	0

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State of Alaska, Oil and Gas Conservation Commission

Production History for: MILNE POINT, SAG RIVER OIL Pool

Jan 1958 Dec 2004

<u>Month</u>	<u>DaysProd</u>	<u>Oil (BBL)</u>	<u>Gas (MCF)</u>	<u>Water (BBL)</u>	<u>Producing Wells</u>
May 1995	25	37185	26407	1893	1
Jun 1995	30	21396	17879	9760	1
Jul 1995	17	7464	6059	5069	1
Aug 1995	25	14355	6124	19767	1
Sep 1995	30	26297	11296	13959	1
Oct 1995	31	30788	14676	44364	1
Nov 1995	30	17349	12844	48508	1
Dec 1995	28	17818	17501	47050	1
Year Total		172652	112786	190370	
Jan 1996	31	20342	1374	58514	1
Feb 1996	29	14866	3964	38019	1
Mar 1996	9	4412	2239	12619	1
May 1996	18	12588	9655	20072	2
Jun 1996	27	28041	28168	4742	2
Jul 1996	56	41304	47971	26149	2
Aug 1996	62	36424	43767	70609	2
Sep 1996	62	27694	33081	64664	3
Oct 1996	85	69552	43456	46193	3
Nov 1996	78	43924	42033	63113	3
Dec 1996	89	47228	43519	68419	3
Year Total		346375	299227	473113	
Jan 1997	88	42768	47075	64111	3
Feb 1997	94	46164	45599	57970	4
Mar 1997	110	42504	42982	53604	4
Apr 1997	118	38966	52212	67451	4
May 1997	102	33684	46700	54436	4
Jun 1997	90	18635	21199	33091	3
Jul 1997	105	19942	25851	26150	4
Aug 1997	72	16466	21524	9271	4
Sep 1997	76	23164	26252	2147	3
Oct 1997	93	32211	33770	723	3
Nov 1997	108	26317	38455	64176	4
Dec 1997	93	22061	35789	75409	3
Year Total		362882	437408	508539	
Jan 1998	93	22783	21313	75679	3
Feb 1998	81	18168	22944	61320	3
Mar 1998	123	24488	28278	66373	4
Apr 1998	93	20449	24253	25940	4
May 1998	62	15662	18935	835	2
Jun 1998	56	11684	13590	577	2
Jul 1998	61	13882	13170	317	2
Aug 1998	36	10093	9778	640	2
Sep 1998	46	6656	7449	487	3
Oct 1998	31	6701	7793	392	1
Nov 1998	30	7400	7903	110	1
Dec 1998	30	3952	4287	204	1
Year Total		161918	179693	232874	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MILNE POINT, SAG RIVER OIL Pool

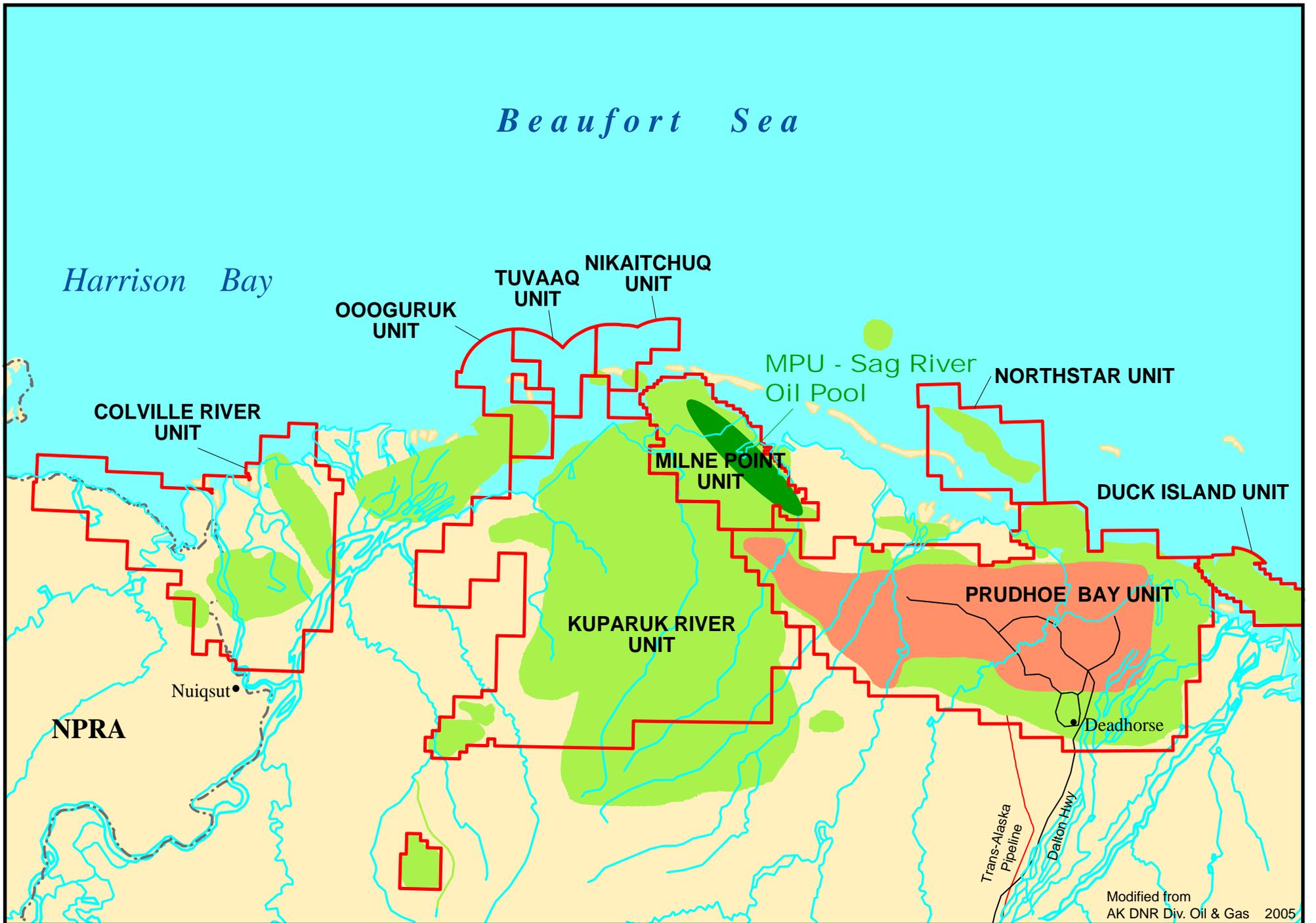
Jan 1958 Dec 2004

<u>Month</u>	<u>DaysProd</u>	<u>Oil (BBL)</u>	<u>Gas (MCF)</u>	<u>Water (BBL)</u>	<u>Producing Wells</u>
Jan 1999	30	3986	6338	73	1
Feb 1999	28	3504	4115	10	1
Mar 1999	31	4497	3693	721	1
Apr 1999	21	3825	2840	201	1
May 1999	19	2170	1619	46	1
Year Total		17982	18605	1051	
Feb 2001	7	19	5	1	1
Mar 2001	31	10538	5473	900	1
Apr 2001	41	20802	15056	0	2
May 2001	49	31909	23916	0	3
Jun 2001	90	42839	35509	1242	3
Jul 2001	82	38368	29011	1595	3
Aug 2001	55	13982	13425	0	2
Sep 2001	44	11327	10154	0	2
Oct 2001	42	21378	18869	0	2
Nov 2001	60	29966	33560	0	2
Dec 2001	62	26889	35102	0	2
Year Total		248017	220080	3738	
Jan 2002	43	14126	20331	187	2
Feb 2002	28	4964	5638	0	1
Mar 2002	58	24812	14083	2567	2
Apr 2002	31	19951	21959	84	2
May 2002	31	16632	25853	0	1
Jun 2002	30	12307	23982	0	1
Jul 2002	27	9674	22029	0	1
Aug 2002	27	11639	17960	0	1
Sep 2002	30	12935	22325	0	1
Oct 2002	7	2903	4966	0	1
Year Total		129943	179126	2838	
Apr 2003	27	10592	12227	0	1
May 2003	30	9036	3773	0	1
Jun 2003	30	16248	13758	0	1
Aug 2003	4	391	590	0	1
Sep 2003	24	16953	18856	0	1
Oct 2003	31	19321	30073	0	1
Nov 2003	30	17855	26768	0	1
Dec 2003	25	11074	15128	0	1
Year Total		101470	121173	0	
Jan 2004	22	8829	9123	0	1
Feb 2004	13	7091	9376	0	1
May 2004	10	4274	2721	0	1
Jun 2004	9	3562	404	0	1
Sep 2004	8	4385	976	0	1
Oct 2004	12	6386	1382	0	1
Dec 2004	21	13244	3768	1487	1
Year Total		47771	27750	1487	
Pool Total		1,589,010	1,595,848	1,414,010	

State of Alaska, Oil and Gas Conservation Commission

Injection History for: **MILNE POINT, SAG RIVER OIL Pool**

<u>Month</u>	<u>DaysInj</u>	<u>Liquid (BBL)</u>	<u>Gas (MCF)</u>	<u>Injecting Wells</u>
Jul 2002	31	102801	0	1
Aug 2002	31	62434	0	1
Sep 2002	30	123473	0	1
Oct 2002	31	126066	0	1
Nov 2002	30	118140	0	1
Dec 2002	31	120241	0	1
Year Total		653155	0	
Jan 2003	31	77456	0	1
Feb 2003	28	118055	0	1
Mar 2003	31	109843	0	1
Apr 2003	28	30413	8292	1
May 2003	31	0	38716	1
Jun 2003	30	0	40689	1
Jul 2003	24	0	6242	1
Aug 2003	31	0	31297	1
Sep 2003	30	0	30344	1
Oct 2003	28	0	13326	1
Nov 2003	20	0	6597	1
Dec 2003	15	0	3530	1
Year Total		335767	179033	
Jan 2004	22	0	17518	1
Feb 2004	29	0	29164	1
Mar 2004	31	465	22803	1
Apr 2004	29	63939	0	1
May 2004	12	27713	0	1
Year Total		92117	69485	
Pool Total		1,081,039	248,518	



North Slope, Alaska

MILNE POINT, SAG RIVER OIL

Reference List

Alaska Oil and Gas Conservation Commission, 1998, Conservation Order No. 423, available online at:
http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co400_449/co423.htm

Alaska Oil and Gas Conservation Commission, 2005, Production Database

Milne Point, Sag River Oil

Summary

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Geology

Within the pool, the Sag River consists of late Triassic to early Jurassic-aged, thin marine shelf sediments: At Milne Point, the Sag River is divided into four laterally extensive sub-zones that are named, from deepest to shallowest, A through D. The zones are fairly uniform in thickness and have similar reservoir properties. Zone D is non-reservoir siltstone and shale at the top of the Sag River; its average gross thickness is about 21 feet. Zone C is the uppermost sandstone interval. It is generally non-reservoir with porosity to 17%, permeability to 2.9 millidarcies, and an average gross thickness of 10 feet. Zone B is the primary reservoir interval, with porosity to 21%, permeability to 23 millidarcies, and an average gross thickness of 30 feet. Zone A is the basal sandstone unit, which unconformably overlies the Shublik Formation. At Milne Point, it is composed almost entirely of non-reservoir sandstone, with porosity to 18%, permeability to 1.2 millidarcies, and an average gross thickness of about 16 feet. The moderate to good porosity and poor permeability observed in zones A through C are the result of bioturbation and diagenesis. The trapping mechanism observed in the pool is predominately structural, consisting of three-way anticlinal closures sealed against the downthrown side of faults, with throws generally greater than 50 feet. Within the MPU development area, an orthogonal fault pattern segments the oil accumulation into three known equilibration regions, with known oil-water contacts at 9,150', 9,050', and 8,950' true vertical depth subsea.⁴ Oil gravity in the Sag River is about 39 degrees API. Original oil in place ("OOIP") in the pool is estimated to be is about 62 million barrels.⁵

SFD
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¹ Alaska Oil and Gas Conservation Commission, 2005, Production Database

² Alaska Oil and Gas Conservation Commission, 2003, Conservation Order No. 423, available online at: http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co400_449/co423.htm

³ Alaska Oil and Gas Conservation Commission, 2005, Production Database

⁴ Alaska Oil and Gas Conservation Commission, 2003, Conservation Order No. 423, available online at: http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co400_449/co423.htm

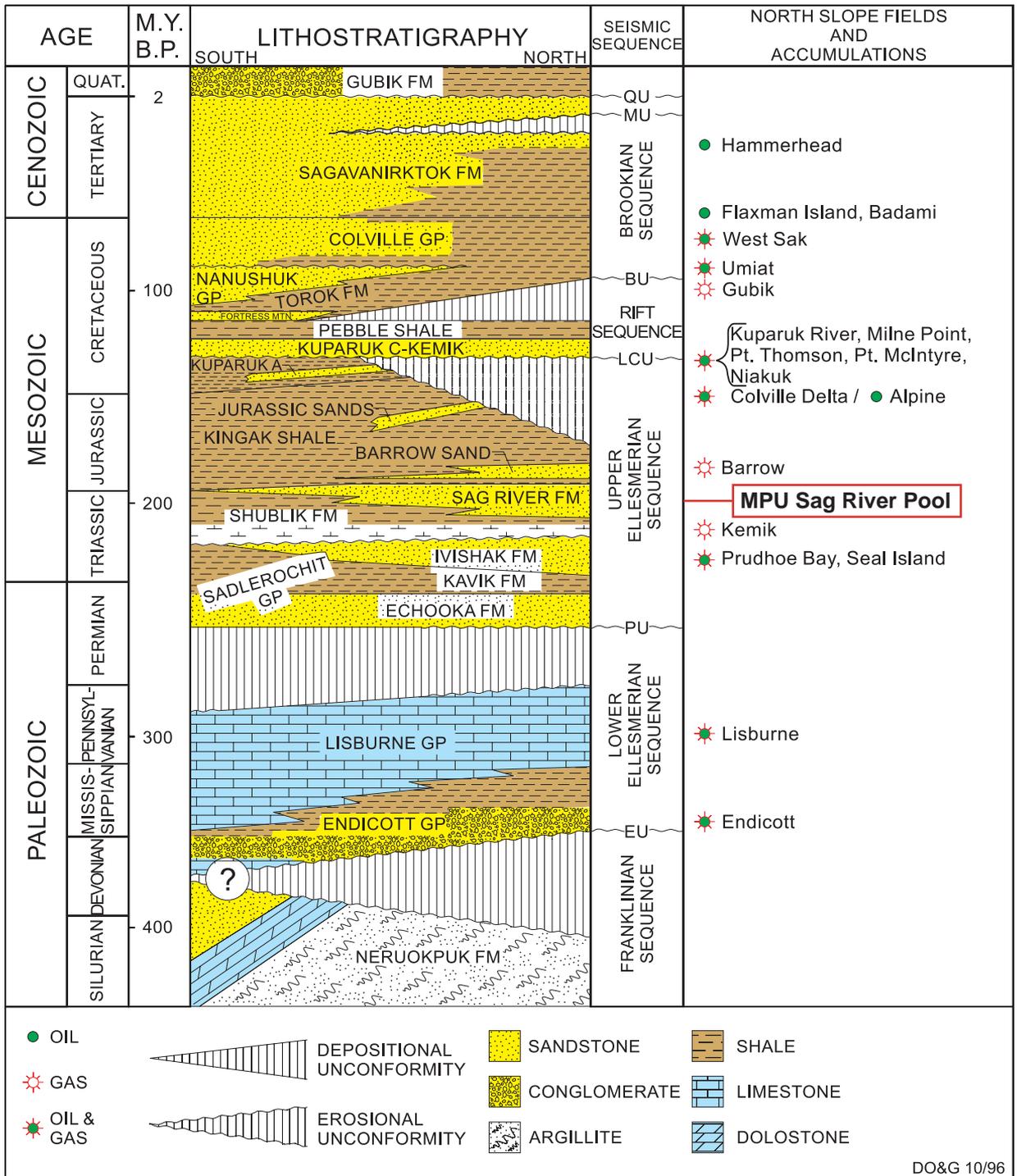
⁵ Alaska Oil and Gas Conservation Commission, 2003, Conservation Order No. 423, available online at: http://www.state.ak.us/local/akpages/ADMIN/ogc/orders/co/co400_449/co423.htm

MILNE POINT FIELD SAG RIVER OIL POOL

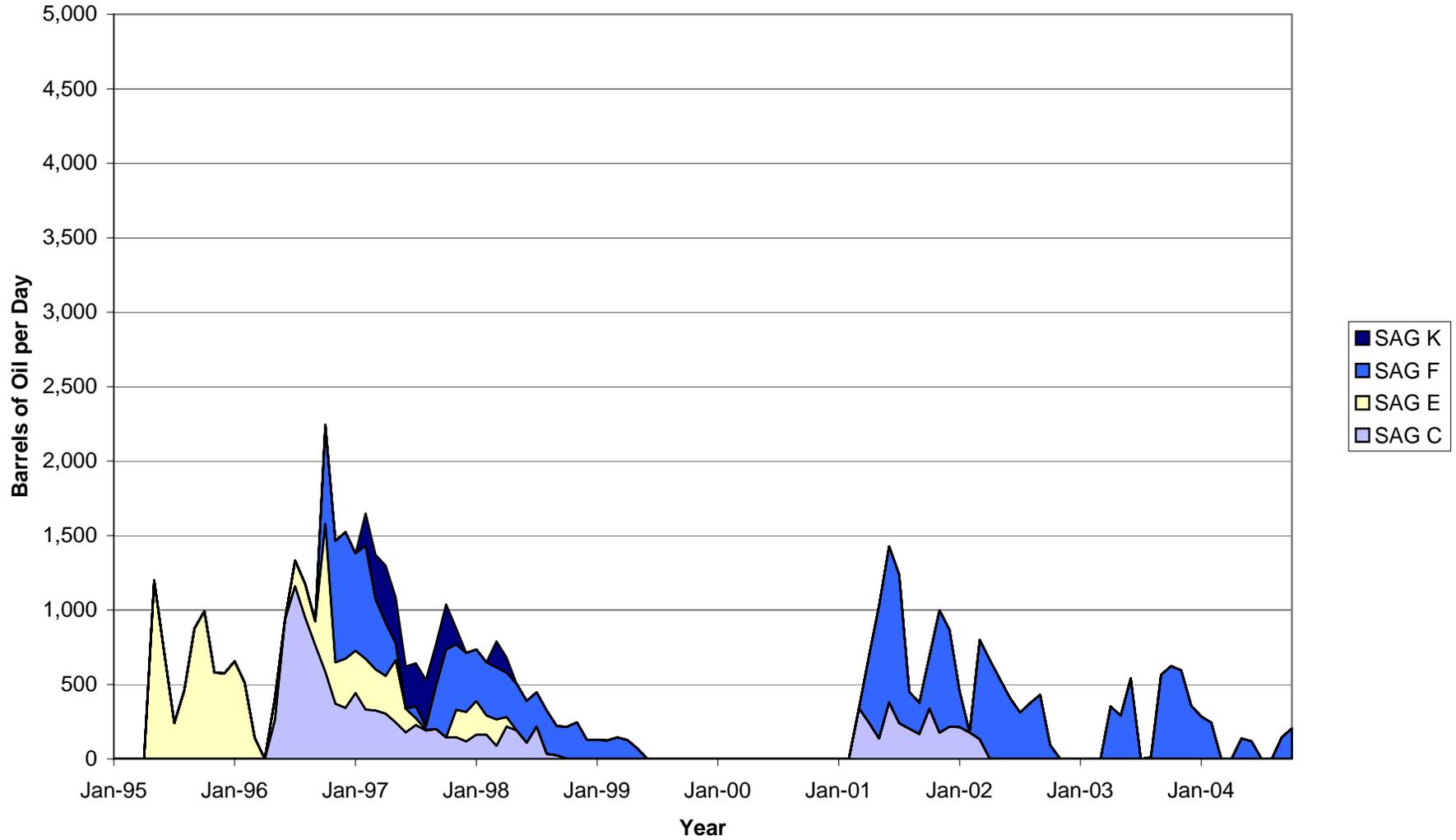
Current Orders

Order No.	AA	Operator	Date	Description	Current
CO	550	0	11-Feb-05	Adoption of rules regulating the use of multiphase meters for well testing and allocation of production.	Y
CO	496	0 BP EXPLORATI	08-Sep-03	Order issued re: proposed rules regulating sustained casing pressures in development wells in all pools within the Milne Point Field.	Y
AIO	10 B	0 BP EXPLORATI	23-Apr-02	Amendment to AIO-10A to allow for underground injection of fluids for enhanced oil recovery in Sag River Oil Pool.	Y
CO	423	0 BP	06-May-98	Defines and establishes pool rules for development of the Sag River Oil Pool in the MPU. Amended by CO 496.	Y
CO	390	0 BP	07-Mar-97	Exception to allow completion of producing wells w/out a packer when electric submersible pumps are installed.	Y

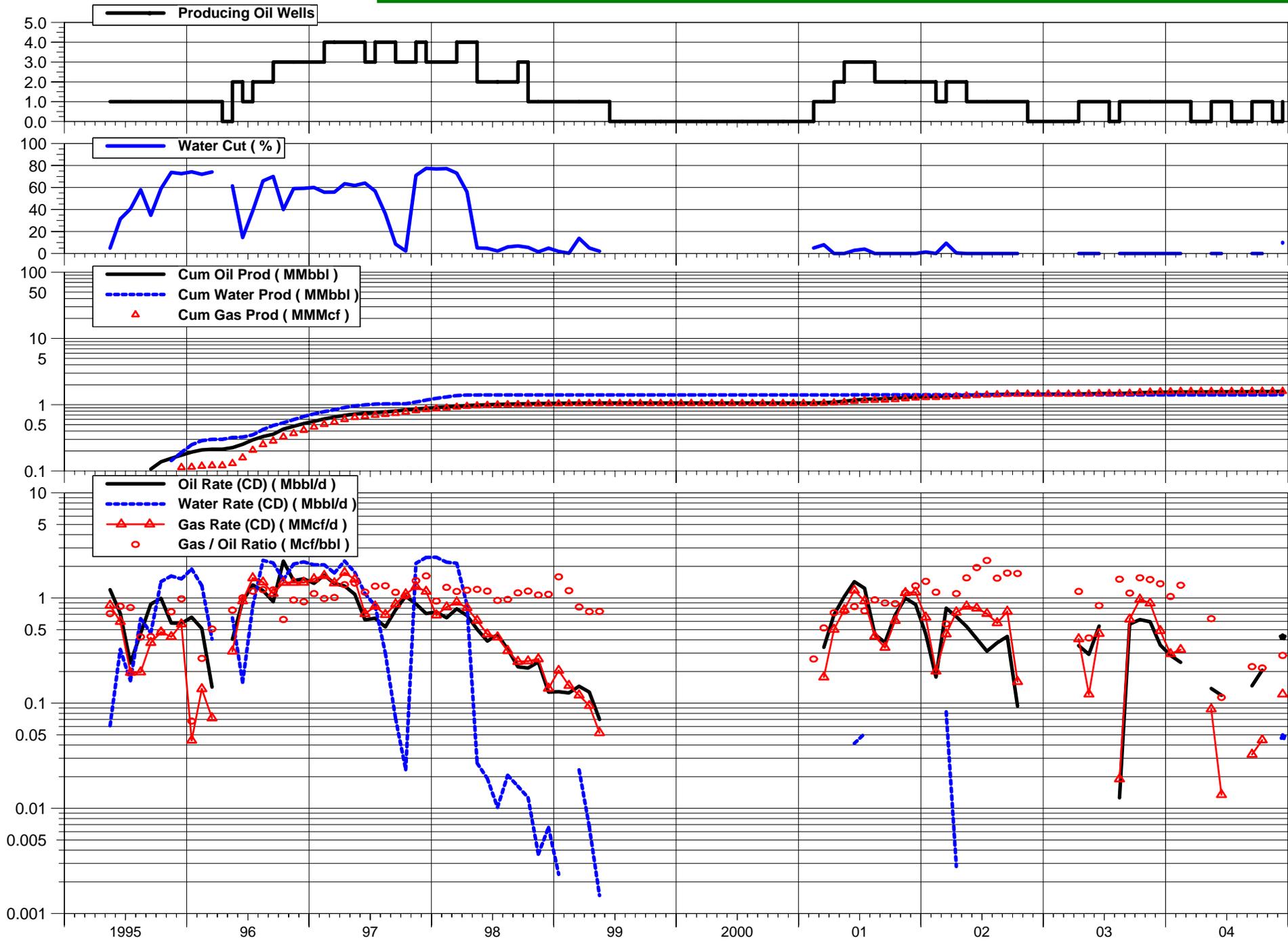
Generalized North Slope Stratigraphic Column displaying oil and gas reservoirs and associated accumulations.



MILNE POINT UNIT - AVERAGE PRODUCTION RATE Sag River Oil Pool



MILNE POINT FIELD, SAG RIVER OIL POOL



MILNE POINT FIELD, SAG RIVER OIL POOL - EOR INJECTION

