AOGCC Pool Statistics McArthur River Field, Mid Kenai Gas Pool

Operator: Union Oil Company of California

Discovery Well: Union Oil Company of California.

Trading Bay Unit G-18

Permit #168-105

API No. 50-733-20160-00-00

Sec. 28, T09N, R13W, SM

Depth: 6,390' MD / 4,510' TVD

December 2, 1968

Status: Producing

Location: **Cook Inlet** Area Loc. Map DNR Unit Map

Orders: Complete List

Summary: Production from the Middle Kenai Gas Pool began in December 1968 from the Grayling Platform, followed shortly thereafter by production from the Dolly Varden and King Salmon Platforms. The initial production consisted of "wet" gas, which contains appreciable amounts of natural gas liquids produced in association with oil from the West Foreland, Hemlock and Middle Kenai G oil pools. Most of the associated gas produced from McArthur River prior to 1988 was not sold commercially; it was used to fuel lease operations and provide gas lift. In 1988, the Steelhead Platform was constructed to produce "dry" gas (methane) from the Grayling Gas Sands. Production from the pool peaked at 225 billion cubic feet per day in November 1997. During December 2004, production from the platform averaged 92.5 million cubic feet per day. About 4% of the gas from this pool is now used for lease operations, and the remainder is sold commercially.

The Middle Kenai Gas Pool is defined as the accumulation of gas common to, and correlative with, the accumulation found in the Marathon Trading Bay Unit wells between the measured depths of 1,518' in well M-1 to 8,982' in well M-14. The Middle Kenai Gas Pool (also known as Grayling Gas Sands) is located within the Upper Middle Miocene Chuitna and Middle Ground Shoal members of the Tyonek Formation, which are part of the Kenai Group. The reservoir sands occur in a continuous sequence that contains the gas accumulations. As currently defined, the Middle Kenai Gas Pool consists of the Upper A series, Zones A through F, and the G-O series, which lies above the G Zone Oil Pool.

In the vicinity of the Steelhead Platform, the non-marine sediments of the Middle Kenai Gas Pool were deposited in fluvial-alluvial meander belts. The sand/shale sequences within this portion of the Tyonek Formation are interbedded with distinctive coal layers, suggesting low energy, swamp-like conditions. Sand units are often conglomeratic, generally thin (20 to 50 feet thick), and may not persist laterally. Porosity ranges from 12 to 32 percent. The McArthur River Field structure is an asymmetric anticline that is oriented approximately north 20° east. The structure is cut by two normal faults that do not affect the limits of the hydrocarbon reservoirs.

McArthur River original gas in place is estimated to be 1.35 TCF.

Structure Map Strat Column

Orig. Gas in Place: 1.35 TCF (Thomas, and others, 2004)

Production: Prod Chart Prod Report Prod Data

	Gas (mcf)	Water (bbls)	Disposed Fluids (bbls)
Cumulative	**999,297,501**	**362,990**	**0**
2001 Total	58,570,285	58,205	0
2002 Total	48,674,161	32,634	0

2003 Total	37,133,934	31,726	0
2004 Total	32,773,113	12,371	0
2003 Rate (/d)	101,737	87	0
2004 Rate (/d)	89,789	34	0
Change (%)	-12%	-61%	0%

Continued: 1 > 2

AOGCC Pool Statistics McArthur River Field, Mid Kenai Gas Pool

Field Development Information:

		Wells In Field				
Type Well	**Status**	**2004**	**2003**	**2002**	**2001**	**2000**
Producer	Gas	20	20	19	17	16
Injector	Disposal	0	0	0	0	0
Non-Operating	Suspended	0	0	0	0	0
	Abandoned	2	2	2	2	2
Total		**22**	**22**	**21**	**19**	**18**

Permitted Wells in Field:

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

Active Completions in Pool (Month of December):

Type Well	Status	2004	2003	2002	2001	2000
Gas Producer	Flowing	15	15	14	15	15
	Other	0	0	0	0	0
	Shut-In	3	2	3	2	1
Disposal	Disposal Injector	0	0	0	0	0
	Shut-In	0	0	0	0	0
Total		**18**	**17**	**17**	**17**	**16**

Reservoir Properties: Tyonek Formation

Description	2004	2003	2002	2001	2000
Reference Datum - ft. below sea level	4500	4500	4500	4500	4500
Temperature - ° F	120	120	120	120	120
Porosity - %	22	22	22	22	22
Permeability - md	900	900	900	900	900
Swi - %	36	36	36	36	36
Orig. Press. - psi	3825-980	3825-980	3825-980	3825-980	3825-980
Curr. Reservoir Press. - psi	525	600	675	700	850
Curr. Reservoir Press. - Test Date	May-04	May-03	May-02	May-01	May-00
Gas Specific Gravity (Air = 1.0)	.564	.564	.564	.564	.564
Gross Pay - ft.	515	515	515	515	515
Net Pay - ft.	375	375	375	375	375

References

Continued: 1 > 2

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Dec 1968	31	0	31517	0	1
Year Total		**0**	**31517**	**0**	
Jan 1969	28	0	42143	0	1
Feb 1969	39	0	79934	0	2
Mar 1969	62	0	121719	0	2
Apr 1969	60	0	251104	0	2
May 1969	62	0	285449	0	2
Jun 1969	60	0	435014	0	2
Jul 1969	59	0	465809	0	2
Aug 1969	79	0	420752	0	3
Sep 1969	88	0	559358	0	3
Oct 1969	92	0	539230	0	3
Nov 1969	90	0	734926	0	3
Dec 1969	92	0	694018	0	3
Year Total		**0**	**4629456**	**0**	
Jan 1970	83	0	555143	0	3
Feb 1970	72	0	383023	0	3
Mar 1970	85	0	452986	0	3
Apr 1970	90	0	539216	0	3
May 1970	72	0	428565	0	3
Jun 1970	90	0	245927	0	3
Jul 1970	88	0	292274	0	3
Aug 1970	93	0	488713	0	3
Sep 1970	90	0	278693	0	3
Oct 1970	93	0	310618	0	3
Nov 1970	90	0	400012	0	3
Dec 1970	93	0	323482	0	3
Year Total		**0**	**4698652**	**0**	
Jan 1971	93	0	332455	0	3
Feb 1971	84	0	264265	0	3
Mar 1971	93	0	324009	0	3
Apr 1971	89	0	352450	0	3
May 1971	93	0	299120	0	3
Jun 1971	90	0	311039	0	3
Jul 1971	90	0	258458	0	3
Aug 1971	93	0	249942	0	3
Sep 1971	90	0	284851	0	3
Oct 1971	93	0	258427	0	3
Nov 1971	90	0	301568	0	3
Dec 1971	92	0	335810	0	3
Year Total		**0**	**3572394**	**0**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1972	93	0	340045	0	3
Feb 1972	87	0	475066	0	3
Mar 1972	93	0	314307	0	3
Apr 1972	89	0	402757	0	3
May 1972	93	0	329401	0	3
Jun 1972	90	0	315140	0	3
Jul 1972	93	0	370212	0	3
Aug 1972	93	0	325388	0	3
Sep 1972	90	0	373679	0	3
Oct 1972	93	0	384679	0	3
Nov 1972	90	0	300697	0	3
Dec 1972	93	0	314117	0	3
Year Total		**0**	**4245488**	**0**	
Jan 1973	93	0	312760	0	3
Feb 1973	84	0	402305	0	3
Mar 1973	93	0	411878	0	3
Apr 1973	90	0	379511	0	3
May 1973	92	0	377133	0	3
Jun 1973	88	0	388454	0	3
Jul 1973	92	0	408361	0	3
Aug 1973	93	0	377261	0	3
Sep 1973	88	0	410485	0	3
Oct 1973	93	0	457867	0	3
Nov 1973	90	0	462753	0	3
Dec 1973	103	0	495878	0	4
Year Total		**0**	**4884646**	**0**	
Jan 1974	100	0	515206	0	4
Feb 1974	92	0	434465	0	4
Mar 1974	123	0	540939	0	4
Apr 1974	118	0	579610	0	4
May 1974	115	0	558468	0	4
Jun 1974	99	0	543649	0	4
Jul 1974	93	0	602237	0	3
Aug 1974	104	0	679452	0	5
Sep 1974	99	0	627096	0	4
Oct 1974	123	0	609589	0	4
Nov 1974	120	0	574407	0	4
Dec 1974	122	0	595503	0	4
Year Total		**0**	**6860621**	**0**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1975	123	0	717626	0	4
Feb 1975	118	0	624846	0	5
Mar 1975	126	0	694483	0	5
Apr 1975	119	0	631427	0	4
May 1975	125	0	696914	0	5
Jun 1975	120	0	526490	0	4
Jul 1975	124	0	608364	0	4
Aug 1975	142	0	757558	0	5
Sep 1975	120	0	618254	0	4
Oct 1975	125	0	664622	0	5
Nov 1975	121	0	712438	0	5
Dec 1975	119	0	743868	0	4
Year Total		**0**	**7996890**	**0**	
Jan 1976	112	0	622164	0	5
Feb 1976	105	0	656503	0	5
Mar 1976	107	0	721887	0	4
Apr 1976	76	0	473015	0	4
May 1976	74	0	468500	0	3
Jun 1976	64	0	407256	0	3
Jul 1976	110	0	572099	0	4
Aug 1976	118	0	531532	0	4
Sep 1976	92	0	583101	0	4
Oct 1976	101	0	602013	0	4
Nov 1976	93	0	506930	0	4
Dec 1976	113	0	679894	0	4
Year Total		**0**	**6824894**	**0**	
Jan 1977	124	0	786058	0	4
Feb 1977	112	0	581627	0	4
Mar 1977	124	0	783588	0	4
Apr 1977	128	0	655650	0	5
May 1977	150	0	640941	0	5
Jun 1977	129	0	577550	0	5
Jul 1977	124	0	593092	0	4
Aug 1977	124	0	650288	0	4
Sep 1977	120	0	648080	0	4
Oct 1977	124	0	638567	0	4
Nov 1977	120	0	613517	0	4
Dec 1977	121	0	567593	0	4
Year Total		**0**	**7736551**	**0**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1978	123	0	692681	0	4
Feb 1978	112	0	597076	0	4
Mar 1978	124	0	630029	0	4
Apr 1978	120	0	642851	0	4
May 1978	124	0	606529	0	4
Jun 1978	120	0	639527	0	4
Jul 1978	124	0	623685	0	4
Aug 1978	124	0	614805	0	4
Sep 1978	120	0	593038	0	4
Oct 1978	124	0	638437	0	4
Nov 1978	141	0	635622	0	5
Dec 1978	155	0	748169	0	5
Year Total		**0**	**7662449**	**0**	
Jan 1979	137	0	664434	0	5
Feb 1979	112	0	594366	0	4
Mar 1979	124	0	486744	0	4
Apr 1979	120	0	632080	0	4
May 1979	124	0	614817	0	4
Jun 1979	145	0	673114	0	5
Jul 1979	155	0	704509	0	5
Aug 1979	155	0	627621	0	5
Sep 1979	150	0	654193	0	5
Oct 1979	155	0	703530	0	5
Nov 1979	150	0	692391	0	5
Dec 1979	154	0	708698	0	5
Year Total		**0**	**7756497**	**0**	
Jan 1980	155	0	633755	0	5
Feb 1980	145	0	614841	0	5
Mar 1980	155	0	668878	0	5
Apr 1980	135	0	608977	0	5
May 1980	124	0	613798	0	4
Jun 1980	119	0	577844	0	4
Jul 1980	124	0	634501	0	4
Aug 1980	124	0	639127	0	4
Sep 1980	120	0	636223	0	4
Oct 1980	124	0	591484	0	4
Nov 1980	120	0	644368	0	4
Dec 1980	134	0	683623	0	5
Year Total		**0**	**7547419**	**0**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1981	124	0	669092	0	4
Feb 1981	112	0	632703	0	4
Mar 1981	124	0	615972	0	4
Apr 1981	120	0	610835	0	4
May 1981	124	0	610457	0	4
Jun 1981	120	0	610968	0	4
Jul 1981	124	0	632804	0	4
Aug 1981	124	0	648888	0	4
Sep 1981	120	0	593095	0	4
Oct 1981	124	0	631352	0	4
Nov 1981	120	0	725224	0	4
Dec 1981	124	0	573992	0	4
Year Total		**0**	**7555382**	**0**	
Jan 1982	124	0	725391	0	4
Feb 1982	112	0	595178	0	4
Mar 1982	124	0	822216	0	4
Apr 1982	120	0	715840	0	4
May 1982	124	0	735752	0	4
Jun 1982	120	0	786067	0	4
Jul 1982	125	0	688620	0	5
Aug 1982	124	0	802597	0	4
Sep 1982	120	0	731142	0	4
Oct 1982	124	0	769399	0	4
Nov 1982	120	0	656622	0	4
Dec 1982	124	0	690185	0	4
Year Total		**0**	**8719009**	**0**	
Jan 1983	124	0	641744	0	4
Feb 1983	112	0	594004	0	4
Mar 1983	124	0	639531	0	4
Apr 1983	122	0	676320	0	5
May 1983	155	0	713038	0	5
Jun 1983	150	0	601901	0	5
Jul 1983	155	0	688864	0	5
Aug 1983	155	0	682690	0	5
Sep 1983	135	0	641255	0	5
Oct 1983	124	0	663161	0	4
Nov 1983	143	0	660656	0	5
Dec 1983	147	0	728149	0	5
Year Total		**0**	**7931313**	**0**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1984	155	0	695382	0	5
Feb 1984	145	0	640233	0	5
Mar 1984	155	0	759669	0	5
Apr 1984	150	0	693592	0	5
May 1984	153	0	732945	0	5
Jun 1984	150	0	730432	0	5
Jul 1984	155	0	768120	0	5
Aug 1984	155	0	828796	0	5
Sep 1984	150	0	845015	0	5
Oct 1984	155	0	850549	0	5
Nov 1984	150	0	826807	0	5
Dec 1984	155	0	870769	0	5
Year Total		**0**	**9242309**	**0**	
Jan 1985	155	0	742757	0	5
Feb 1985	140	0	735875	0	5
Mar 1985	152	0	727869	0	5
Apr 1985	145	0	658919	0	5
May 1985	135	0	554035	0	5
Jun 1985	90	0	274124	0	3
Jul 1985	87	0	245891	0	3
Aug 1985	122	0	286832	0	4
Sep 1985	116	0	317084	0	4
Oct 1985	142	0	579820	0	5
Nov 1985	149	0	697466	0	5
Dec 1985	137	0	782091	0	5
Year Total		**0**	**6602763**	**0**	
Jan 1986	144	0	794567	0	5
Feb 1986	134	0	705509	0	5
Mar 1986	139	0	619880	0	5
Apr 1986	135	0	634595	0	5
May 1986	143	0	752610	0	5
Jun 1986	132	0	795327	0	5
Jul 1986	138	0	871163	0	5
Aug 1986	136	0	809270	0	5
Sep 1986	126	0	804217	0	5
Oct 1986	139	0	805043	0	5
Nov 1986	132	0	747347	0	5
Dec 1986	125	0	823695	0	5
Year Total		**0**	**9163223**	**0**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1987	129	0	789580	0	5
Feb 1987	122	0	659980	0	5
Mar 1987	139	0	758378	0	5
Apr 1987	136	0	769854	0	5
May 1987	135	0	837319	0	5
Jun 1987	136	0	819029	0	5
Jul 1987	145	0	842869	0	5
Aug 1987	161	0	785653	0	6
Sep 1987	164	0	811496	0	7
Oct 1987	171	0	1160786	0	7
Nov 1987	130	0	827296	0	6
Dec 1987	140	0	821730	0	7
Year Total		**0**	**9883970**	**0**	
Jan 1988	124	0	1012501	0	4
Feb 1988	116	0	851485	0	4
Mar 1988	124	0	1068181	0	4
Apr 1988	119	0	961568	0	4
May 1988	124	0	833797	0	4
Jun 1988	120	0	593801	0	4
Jul 1988	124	0	647290	0	4
Aug 1988	124	0	754245	0	4
Sep 1988	121	0	734779	0	5
Oct 1988	182	0	1665103	0	6
Nov 1988	176	0	1508807	0	6
Dec 1988	160	0	1971033	0	6
Year Total		**0**	**12602590**	**0**	
Jan 1989	164	0	2152938	0	6
Feb 1989	164	0	2270570	0	6
Mar 1989	184	0	2293532	0	6
Apr 1989	180	0	2107693	0	6
May 1989	186	0	2089206	0	6
Jun 1989	180	0	2140050	0	6
Jul 1989	186	0	2317418	0	6
Aug 1989	141	0	999882	0	6
Sep 1989	141	0	960605	0	6
Oct 1989	187	0	2439375	0	7
Nov 1989	206	0	3352160	0	7
Dec 1989	217	0	3559164	0	7
Year Total		**0**	**26682593**	**0**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1990	211	0	3379317	0	8
Feb 1990	221	0	3608701	0	8
Mar 1990	241	0	4004684	0	9
Apr 1990	249	0	4192272	0	9
May 1990	243	0	3942213	0	9
Jun 1990	235	0	3988590	0	8
Jul 1990	241	0	3947902	0	8
Aug 1990	264	0	4237010	0	10
Sep 1990	296	0	3790584	0	10
Oct 1990	303	0	3942119	0	10
Nov 1990	311	0	4470233	0	11
Dec 1990	340	0	5393121	0	11
Year Total		**0**	**48896746**	**0**	
Jan 1991	339	0	5240645	0	11
Feb 1991	303	0	4820759	0	11
Mar 1991	316	0	4779224	0	11
Apr 1991	319	0	4723924	0	11
May 1991	306	0	4209897	0	11
Jun 1991	311	0	4851273	0	11
Jul 1991	291	0	4776066	0	10
Aug 1991	305	0	4922667	0	10
Sep 1991	279	0	3666592	0	10
Oct 1991	273	0	3550528	0	10
Nov 1991	322	0	5102009	0	11
Dec 1991	332	0	5430935	0	11
Year Total		**0**	**56074519**	**0**	
Jan 1992	337	0	5790069	0	11
Feb 1992	315	0	5863758	0	11
Mar 1992	334	0	5842661	0	11
Apr 1992	305	0	6049737	0	11
May 1992	336	0	5588620	0	11
Jun 1992	312	0	4834904	0	11
Jul 1992	300	0	5295041	0	10
Aug 1992	320	0	3633638	0	11
Sep 1992	255	0	4039836	0	11
Oct 1992	308	0	5772871	0	11
Nov 1992	293	0	5882122	0	11
Dec 1992	325	0	6733387	0	12
Year Total		**0**	**65326644**	**0**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1993	326	0	6477813	0	12
Feb 1993	268	0	4734446	0	12
Mar 1993	300	0	4838901	0	12
Apr 1993	272	0	4637454	0	12
May 1993	285	0	4799877	0	11
Jun 1993	291	0	4965724	0	11
Jul 1993	283	0	4753724	0	11
Aug 1993	203	0	2375114	0	11
Sep 1993	289	0	4112523	0	12
Oct 1993	305	0	4759755	0	12
Nov 1993	360	0	6404559	0	12
Dec 1993	345	0	5545719	0	12
Year Total		**0**	**58405609**	**0**	
Jan 1994	342	0	4450359	0	13
Feb 1994	320	0	4703607	0	12
Mar 1994	367	0	5201272	0	12
Apr 1994	324	0	3481318	0	12
May 1994	248	0	1842659	0	12
Jun 1994	254	0	2169040	0	12
Jul 1994	247	0	2452204	0	8
Aug 1994	264	0	2663403	0	9
Sep 1994	262	0	2739517	0	12
Oct 1994	351	0	4774806	0	12
Nov 1994	352	0	5865287	0	12
Dec 1994	360	0	5477825	0	12
Year Total		**0**	**45821297**	**0**	
Jan 1995	369	0	5655189	0	12
Feb 1995	336	0	3753784	0	12
Mar 1995	372	0	5926794	0	12
Apr 1995	339	0	4451577	0	13
May 1995	329	0	3253890	0	12
Jun 1995	336	0	3514380	0	12
Jul 1995	330	0	2897538	0	12
Aug 1995	358	0	3558966	0	12
Sep 1995	312	0	2751153	0	12
Oct 1995	335	0	3804961	0	12
Nov 1995	345	0	5215484	0	12
Dec 1995	341	0	5727053	0	11
Year Total		**0**	**50510769**	**0**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1996	336	0	5608077	1268	11
Feb 1996	318	0	5132152	2359	11
Mar 1996	341	0	5361854	3095	11
Apr 1996	326	0	4514830	2414	11
May 1996	313	0	4726245	1822	11
Jun 1996	325	0	5067974	2162	11
Jul 1996	333	0	5206816	2245	11
Aug 1996	302	0	4077772	1887	11
Sep 1996	331	0	4931109	3932	12
Oct 1996	345	0	5938519	1641	12
Nov 1996	329	0	6232715	1847	12
Dec 1996	341	0	6713595	1398	11
Year Total		**0**	**63511658**	**26070**	
Jan 1997	306	0	5716549	1109	11
Feb 1997	308	0	5365416	1193	11
Mar 1997	332	0	5870561	1271	11
Apr 1997	330	0	5445649	2070	11
May 1997	340	0	4536280	994	11
Jun 1997	330	0	4267044	1080	11
Jul 1997	341	0	4168410	1304	11
Aug 1997	338	0	4159034	574	11
Sep 1997	295	0	4121064	1368	12
Oct 1997	385	0	6018078	3841	14
Nov 1997	378	0	6753516	2479	13
Dec 1997	397	0	6857734	1515	13
Year Total		**0**	**63279335**	**18798**	
Jan 1998	402	0	6471876	1737	13
Feb 1998	363	0	5752426	2057	14
Mar 1998	403	0	6424591	979	13
Apr 1998	390	0	5897360	2510	13
May 1998	403	0	4826786	1544	13
Jun 1998	390	0	5299156	2484	13
Jul 1998	402	0	5941220	2472	13
Aug 1998	373	0	5303866	2055	13
Sep 1998	390	0	5453259	1377	14
Oct 1998	403	0	5973649	788	14
Nov 1998	390	0	6414152	2021	13
Dec 1998	403	0	6342512	1017	13
Year Total		**0**	**70100853**	**21041**	

State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

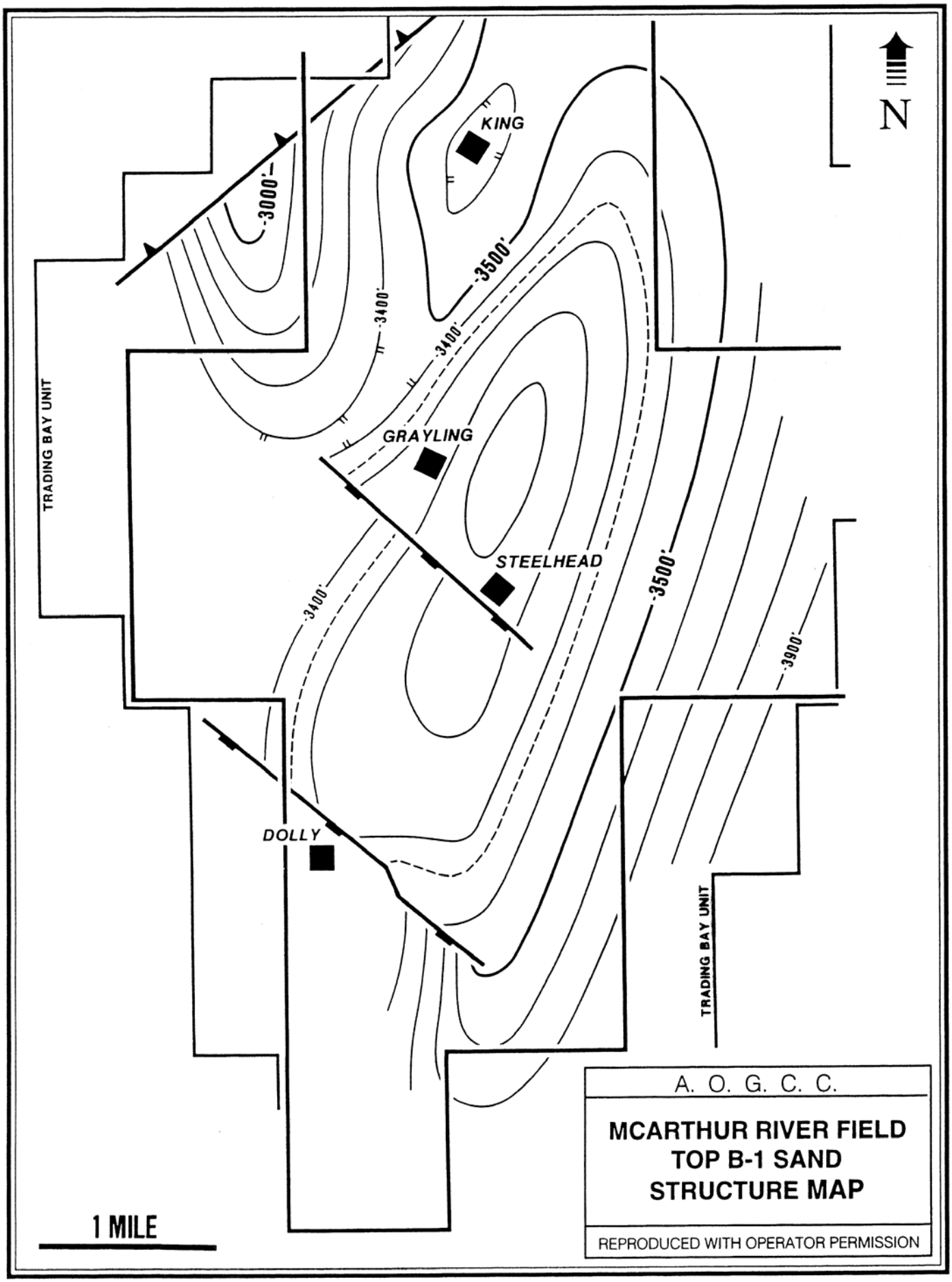
Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 1999	403	0	6357587	4770	13
Feb 1999	365	0	5453151	4767	14
Mar 1999	406	0	6200799	5515	14
Apr 1999	388	0	5860577	5329	14
May 1999	404	0	6105874	5661	14
Jun 1999	391	0	5699303	5360	14
Jul 1999	411	0	4204762	5668	14
Aug 1999	434	0	4016524	2436	14
Sep 1999	417	0	3208164	4187	14
Oct 1999	434	0	6025692	4371	14
Nov 1999	443	0	6157328	5840	15
Dec 1999	465	0	6350454	5622	15
Year Total		**0**	**65640215**	**59526**	
Jan 2000	464	0	6225681	5783	15
Feb 2000	435	0	5539497	5833	15
Mar 2000	465	0	5749347	7288	15
Apr 2000	447	0	5433539	7463	15
May 2000	440	0	5170338	7920	15
Jun 2000	422	0	5053097	11811	15
Jul 2000	436	0	5273216	10658	15
Aug 2000	434	0	5217479	7572	14
Sep 2000	437	0	4704188	11449	15
Oct 2000	465	0	4831501	11854	15
Nov 2000	415	0	4263732	5476	15
Dec 2000	418	0	4311298	9690	15
Year Total		**0**	**61772913**	**102797**	
Jan 2001	465	0	5116985	8363	15
Feb 2001	420	0	4825078	7334	15
Mar 2001	465	0	5600014	7461	15
Apr 2001	450	0	5172690	7249	15
May 2001	465	0	5019248	7659	15
Jun 2001	442	0	4572959	6505	15
Jul 2001	443	0	4568107	3920	15
Aug 2001	421	0	4626562	2184	14
Sep 2001	426	0	4310819	3728	15
Oct 2001	433	0	4680516	2342	15
Nov 2001	419	0	5043737	573	14
Dec 2001	438	0	5233570	707	15
Year Total		**0**	**58770285**	**58025**	

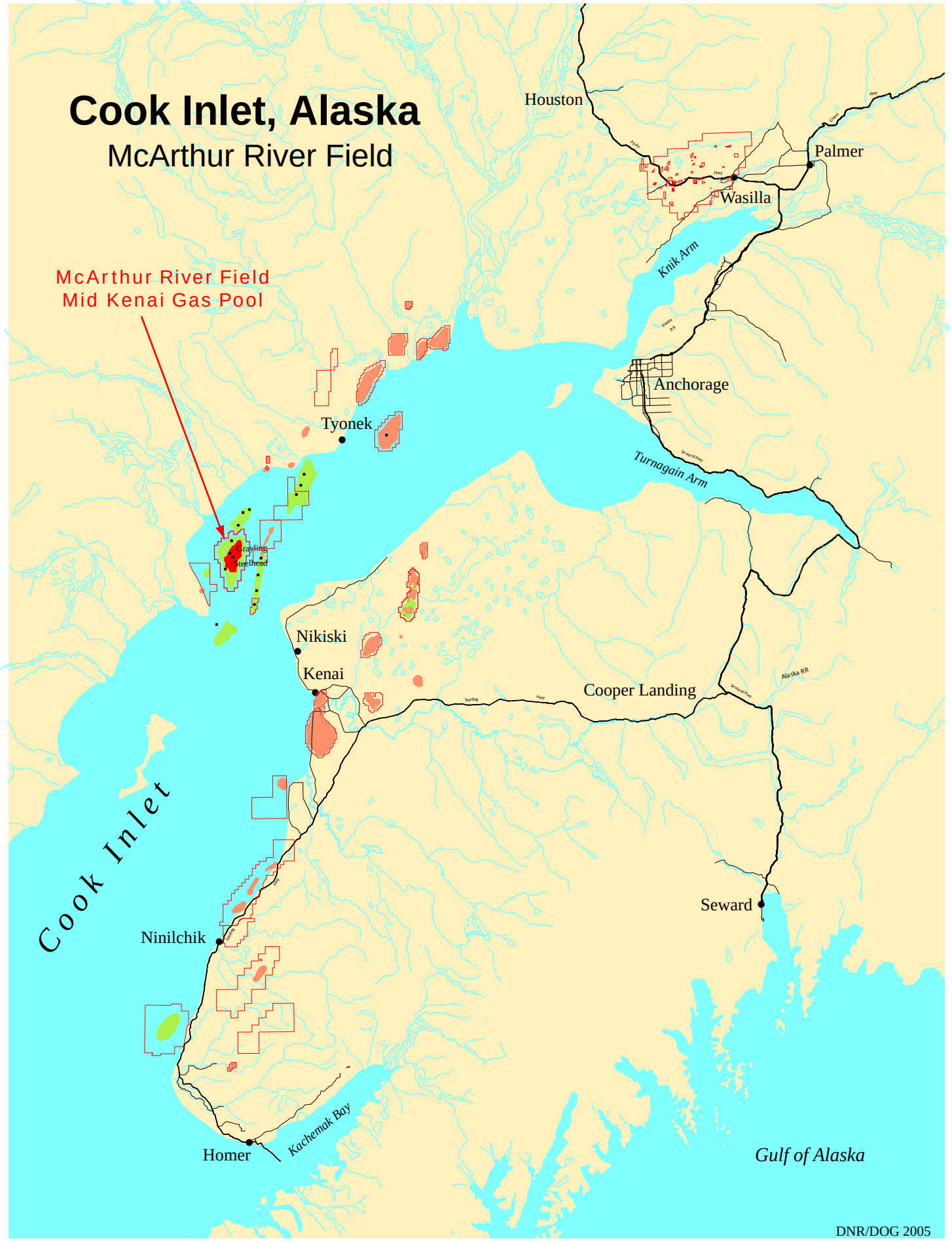
State of Alaska, Oil and Gas Conservation Commission

Production History for: MCARTHUR RIVER, MIDKENAI GAS Pool

Jan 1958

Month	DaysProd	Oil (BBL)	Gas (MCF)	Water (BBL)	Producing Wells
Jan 2002	465	0	5176882	1007	15
Feb 2002	420	0	4692577	2391	15
Mar 2002	460	0	4808789	2727	15
Apr 2002	448	0	4381646	2736	15
May 2002	479	0	3826469	1810	16
Jun 2002	447	0	4004210	2119	15
Jul 2002	452	0	3930441	4869	15
Aug 2002	396	0	3135206	1530	14
Sep 2002	407	0	3387944	4153	15
Oct 2002	434	0	3910282	4096	14
Nov 2002	420	0	3709239	1892	14
Dec 2002	434	0	3710476	3304	14
Year Total		**0**	**48674161**	**32634**	
Jan 2003	434	0	3606359	4125	14
Feb 2003	392	0	3319783	4173	14
Mar 2003	441	0	3523987	4178	15
Apr 2003	430	0	3484675	3567	15
May 2003	434	0	3283467	3392	14
Jun 2003	418	0	3038949	3743	14
Jul 2003	415	0	2986436	1613	14
Aug 2003	401	0	2226470	675	13
Sep 2003	390	0	2489982	899	13
Oct 2003	404	0	2864928	977	14
Nov 2003	389	0	2822104	2206	14
Dec 2003	435	0	3261618	2180	15
Year Total		**0**	**36908758**	**31728**	
Jan 2004	451	0	3248158	1206	15
Feb 2004	435	0	2886525	849	15
Mar 2004	465	0	3105747	735	15
Apr 2004	450	0	3014907	1101	15
May 2004	495	0	2101935	506	16
Jun 2004	478	0	2573249	948	16
Jul 2004	470	0	2643288	1230	16
Aug 2004	465	0	2475423	1158	15
Sep 2004	443	0	2449760	1357	15
Oct 2004	449	0	2593296	1120	15
Nov 2004	450	0	2811053	1078	15
Dec 2004	454	0	2869772	1083	15
Year Total		**0**	**32773113**	**12371**	
Pool Total		**0**	**999,297,501**	**362,990**	


N
KING
-3000'
-3500'
-3400'
-3400'
GRAYLING
STEELHEAD
-3400'
-3500'
-3900'
DOLLY
TRADING BAY UNIT
TRADING BAY UNIT
1 MILE
A. O. G. C. C.
MCARTHUR RIVER FIELD
TOP B-1 SAND
STRUCTURE MAP
REPRODUCED WITH OPERATOR PERMISSION


Cook Inlet, Alaska
McArthur River Field
McArthur River Field
Mid Kenai Gas Pool
Houston
Palmer
Wasilla
Knik Arm
Anchorage
Tyonek
Turnagain Arm
Grayling
Steelhead
Nikiski
Kenai
Cooper Landing
Alaska RR
Cook Inlet
Seward
Ninilchik
Kachemak Bay
Homer
Gulf of Alaska
DNR/DOG 2005

McArthur River Field
Middle Kenai Gas Pool

Type Log

Trading Bay Unit G-18
PTD 168-105

SCHLUMBERGER — DUAL INDUCTION-LATEROLOG

COMPANY UNION OIL CO. OF CALIFORNIA
WELL TRADING BAY UNIT G-18 (22-28)
FIELD MC ARTHUR RIVER
COUNTY KENAI BOROUGH STATE ALASKA
Other Services: SNP, CDL, CBL, VDL, GR, CCL

RECEIVED JAN 17 1969 DIVISION OF OIL AND GAS ANCHORAGE, ALASKA

Permanent Datum: GL Elev. 94'
Log Measured From: KB 26' Above Perm. Datum
Drilling Measured From: KB Elev. 94'

Run No. One | Depth-Driller 8190' | Depth-Logger 8188' | Bottom Logged Interval 8188' | Top Log Interval 1100' | Casing-Driller 13 3/8" @ 1100' | Casing-Logger 1100' | Bit Size 12 1/4" | Type Fluid in Hole BRINE | Dens. 9.6 | Visc. 40 | Source of Sample FLOWLINE | R_m @ Meas. Temp. .44 @ 75°F | R_mf @ Meas. Temp. .44 @ 75°F | R_mc @ Meas. Temp. .44 @ 75°F | Source R_mf R_mc MEASURED | R_m @ BHT .44 @ 175°F | R_mf @ BHT .44 @ 175°F | R_mc @ BHT .44 @ 175°F | Top Log Interval 1100' | Bottom Log Interval 8188' | Type of Log DIL-SP-CDL-CBL-VDL-GR-CCL | Max. Rec. Temp. 175°F | Equip. Location 3-A | Recorded By HOLT | Witnessed By MCCARTY

FOLD HERE — The well name, location and borehole reference data were furnished by the customer.

REMARKS

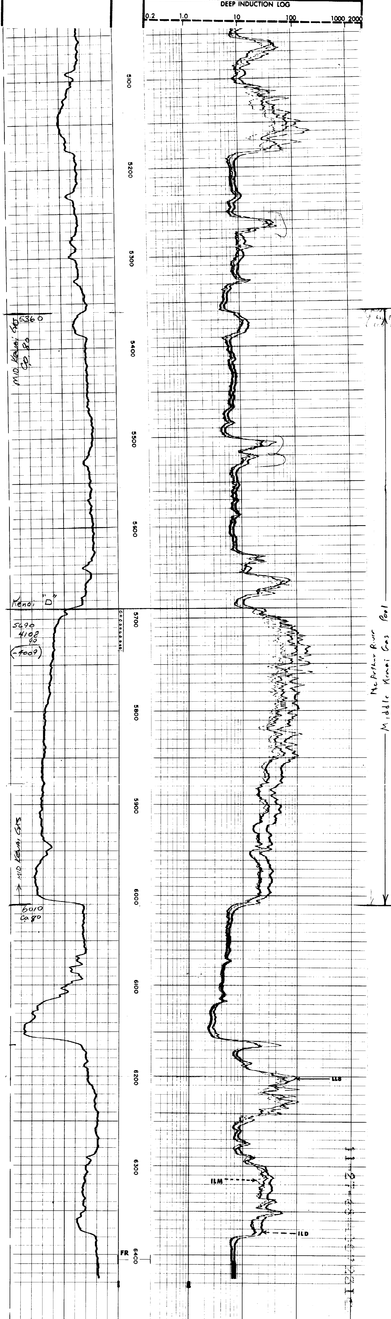
Changes in Mud Type or Additional Samples
Date Sample No.
Depth—Driller
Type Fluid in Hole
Dens. Visc.
pH Fluid Loss ml
Source of Sample
R_m @ Meas. Temp. @ °F
R_mf @ Meas. Temp. @ °F
R_mc @ Meas. Temp. @ °F
Source R_mf R_mc
R_m @ BHT @ °F
R_mf @ BHT @ °F
R_mc @ BHT @ °F

Type Log	Depth	Scale Changes: Scale Up Hole	Scale Down Hole

Equipment Data: Tool Position STANDOFF; Other

	Run No.	Tool Type
Run No.	ONE	DIL-SP
C.D.	USED	
S.O.		
Equip. PANEL No.	DIF-X 152	
Used CART No.	DIF-E 16	
SONDE No.	DIF-E 176	
IAP No.	DIF-E 1	
S.B.E.		

Check one, filling in blanks where applicable:
☐ Surface determined sonde errors used for ILM and ILD.
☐ ILM and ILD sonde errors corrected for borehole signal at R_m = ohm
☐ ILM and ILD zeros set in hole at depth of feet.



LATEROLOG – 8
MEDIUM INDUCTION LOG
DEEP INDUCTION LOG
0.2 1.0 10 100 1000 2000
SPONTANEOUS POTENTIAL millivolts
DEPTHS
RESISTIVITY ohms – m²/m

COMPANY UNION OIL COMPANY OF CALIFORNIA
WELL T.B.U. G-18 (22-28)
FIELD MC ARTHUR RIVER
COUNTY KENAI BOROUGH STATE ALASKA

SCHL. FR. 6406
SCHL. TD. 8188
DRLR TD. 8190
Elev: KB 94
DF
GL

McArthur River Field
Middle Kenai Gas Pool

Type Log
Trading Bay Unit State G-2
PTD 167-048

SCHLUMBERGER

DUAL INDUCTION - LATERLOG

COMPANY: MARATHON OIL COMPANY
WELL: TRADING BAY UNIT STATE G-2
FIELD: MIDDLE KENAI GAS POOL
COUNTY: KENAI PENINSULA
STATE: ALASKA
LOCATION: 1980' FSL & 1980' FEL
SEC. 16 TWP. 8N RGE. 13W
PERMANENT DATUM: GROUND LEVEL
ELEVATION: 0 ft. above PERMANENT DATUM
LOG MEASURED FROM: KELLY BUSHING 0 ft. above PERMANENT DATUM
DRILLING MEASURED FROM: KELLY BUSHING
DATE: 10-03-67
RUN NO.: ONE
TYPE FLUID IN HOLE: DRILL MUD
DENSITY: 9.4 lb/gal
VISCOSITY: 38 sec
PH: 10.5
FLUID LOSS: 6.4 cc
SOURCE OF SAMPLE: PIT
RM @ MEAS. TEMP.: 1.0 @ 70°F
RMF @ MEAS. TEMP.: 1.0 @ 70°F
RMC @ MEAS. TEMP.: 1.0 @ 70°F
SOURCE OF RMF & RMC: MEASURED
RM @ BHT: 0.5 @ 150°F
TIME CIRCULATION STOPPED: 3:00 A.M.
TIME LOGGER ON BOTTOM: 6:00 A.M.
MAX. REC. TEMP.: 150°F
EQUIPMENT NO.: 1-1-1
LOCATION: ANCHORAGE
RECORDED BY: J. CLAYTON
WITNESSED BY: MR. MOSS

COMPANY: MARATHON OIL COMPANY
WELL: TRADING BAY UNIT STATE G-2
FIELD: MIDDLE KENAI GAS POOL
COUNTY: KENAI PENINSULA
STATE: ALASKA

The well name, location and borehole reference data were furnished by the customer.

REMARKS:

Changes in Mud Type or Additional Sample Depths: None
Hole Condition: Good
Type Fluid in Hole: Water

Tools	Type	Serial No.	Hours
Dual Induction Laterlog			
Pre-Amp Sonde			
Pre-Amp Power Supply			
Pre-Amp Sonde			
Pre-Amp Power Supply			
Power Supply			
Power Supply			
Pre-Amp Sonde			
Pre-Amp Power Supply			
Pre-Amp Sonde			
Pre-Amp Power Supply			
Power Supply			
Power Supply			

MCARTHUR RIVER, MIDKENAI GAS

Reference List

Alaska Oil and Gas Conservation Commission, 1969, Conservation Order No. 80, McArthur River Field, Middle Kenai Gas Pool, Middle Kenai "G" Oil Pool, Hemlock Oil Pool, West Foreland Oil Pool

Alaska Oil and Gas Conservation Commission, 1987, Conservation Order No. 228, McArthur River Field, Middle Kenai Gas Pool,

Alaska Oil and Gas Conservation Commission, 2005, Well and Production Information Database

Anderson, R.T., 1990, Trading Bay Unit, State of Alaska, Revised Conservation Orders Nos. 80 and 228; in Alaska Oil and Gas Conservation Commission, 1987, Conservation Order No. 228 File

Nelson, K., 2003, State Approves Trading Bay Expansion in Cook Inlet, in Petroleum News, Vol. 8, No. 28, week of July 13, 2003, available online at: http://www.petroleumnews.com/pnads/675629129.shtml

State of Alaska Department of Administration, Office of Tax Appeals, 1991, Marathon Oil Company, Oil Production Tax, Amended Findings of Fact, Conclusions of Law and Order 1, online at http://www.state.ak.us/admin/ota/marathon.htm

Thomas, C.P., Doughty, T.C., Faulder, D.D., and Hite, D.M., 2004, South-Central Alaska Natural Gas Study, U.S. Department of Energy, National Energy Technology Laboratory, Arctic Energy Office, Contract DE-AM26-99FT40575

UNOCAL, 1990, Engineering and Geologic Report, Exhibit A submitted in support of in expanding the Middle Kenai Gas Pool, Conservation Order No. 228

McArthur River, Middle Kenai Gas Pool

Pool Summary

Production from the Middle Kenai Gas Pool began in December 1968 from the Grayling Platform, followed shortly thereafter by production from the Dolly Varden and King Salmon Platforms.[1] The initial production consisted of "wet" gas, which contains appreciable amounts of natural gas liquids produced in association with oil from the West Foreland, Hemlock and Middle Kenai G oil pools. Most of the associated gas produced from McArthur River prior to 1988 was not sold commercially; it was used to fuel lease operations and provide gas lift.[2] In 1988, the Steelhead Platform was constructed to produce "dry" gas (methane) from the Grayling Gas Sands.[3] Production from the pool peaked at 225 billion cubic feet per day in November 1997. During December 2004, production from the platform averaged 92.5 million cubic feet per day.[4] About 4% of the gas from this pool is now used for lease operations,[5] and the remainder is sold commercially.[6]

The Middle Kenai Gas Pool is defined as the accumulation of gas common to, and correlative with, the accumulation found in the Marathon Trading Bay Unit wells between the measured depths of 1,518' in well M-1 to 8,982' in well M-14.[7] The Middle Kenai Gas Pool (also known as Grayling Gas Sands) is located within the Upper Middle Miocene Chuitna and Middle Ground Shoal members of the Tyonek Formation, which are part of the Kenai Group.[8] The reservoir sands occur in a continuous sequence that contains the gas accumulations.[9] As currently defined, the Middle Kenai Gas Pool consists of the Upper A series, Zones A through F, and the G-O series, which lies above the G Zone Oil Pool.[10]

In the vicinity of' the Steelhead Platform, the non-marine sediments of the Middle Kenai Gas Pool were deposited in fluvial-alluvial meander belts. The sand/shale sequences within this portion of the Tyonek Formation are interbedded with distinctive coal layers, suggesting low energy, swamp-like conditions. Sand units are often conglomeratic, generally thin (20 to 50 feet thick), and may not persist laterally. Porosity ranges from 12 to 32 percent. The McArthur River Field structure is an asymmetric anticline that is oriented approximately north 20° east. The structure is cut by two normal faults that do not affect the limits of the hydrocarbon reservoirs.[11]

McArthur River original gas in place is estimated to be 1.35 TCF.[12]

---

[1] Alaska Oil and Gas Conservation Commission, 2005, Well and Production Information Database
[2] State of Alaska Department of Administration, Office of Tax Appeals, 1991, Marathon Oil Company, Oil Production Tax, Amended Findings of Fact, Conclusions of Law and Order 1, online at http://www.state.ak.us/admin/ota/marathon.htm
[3] State of Alaska Department of Administration, Office of Tax Appeals, 1991, Marathon Oil Company, Oil Production Tax, Amended Findings of Fact, Conclusions of Law and Order 1, online at http://www.state.ak.us/admin/ota/marathon.htm
[4] Alaska Oil and Gas Conservation Commission, 2005, Well and Production Information Database
[5] Thomas, C.P., Doughty, T.C., Faulder, D.D., and Hite, D.M., 2004, South-Central Alaska Natural Gas Study, U.S. Department of Energy, National Energy Technology Laboratory, Arctic Energy Office, Contract DE-AM26-99FT40575, p. 160.
[6] State of Alaska Department of Administration, Office of Tax Appeals, 1991, Marathon Oil Company, Oil Production Tax, Amended Findings of Fact, Conclusions of Law and Order 1, online at http://www.state.ak.us/admin/ota/marathon.htm
[7] Anderson, R.T., 1990, Trading Bay Unit, State of Alaska, Revised Conservation Orders Nos. 80 and 228; in Alaska Oil and Gas Conservation Commission, 1987, Conservation Order No. 228 File
[8] UNOCAL, 1990, Engineering and Geologic Report, Exhibit A submitted in support of in expanding the Middle Kenai Gas Pool, Conservation Order No. 228
[9] UNOCAL, 1990, Engineering and Geologic Report, Exhibit A submitted in support of in expanding the Middle Kenai Gas Pool, Conservation Order No. 228
[10] UNOCAL, 1990, Engineering and Geologic Report, Exhibit A submitted in support of in expanding the Middle Kenai Gas Pool, Conservation Order No. 228
[11] UNOCAL, 1990, Engineering and Geologic Report, Exhibit A submitted in support of in expanding the Middle Kenai Gas Pool, Conservation Order No. 228
[12] Thomas, C.P., Doughty, T.C., Faulder, D.D., and Hite, D.M., 2004, South-Central Alaska Natural Gas Study, U.S. Department of Energy, National Energy Technology Laboratory, Arctic Energy Office, Contract DE-AM26-99FT40575, p. 166.

MCARTHUR RIVER FIELD

No Pool

Current Orders

Order No.		AA	Operator	Date	Description	Current
CO	234 A	1	UNION OIL CO	11-Jul-95	Waiver of the production logging requirements of CO 234A Rule 3 for TBU wells K-3RD and K-19RD.	Y
CO	351	0	UNION OIL CO	29-Dec-94	Exempts field from requirements of 20 AAC 25.280(a) & (b).	Y
CO	350	0	UNION OIL CO	23-Dec-94	Permit commingling of production from Middle Kenai "G" Hemlock/W Foreland/undefined Jurassic Oil Pools, in TBU M-32 wellbore.	Y
CO	234 A	0	UNION OIL CO	21-Dec-93	Commingling of produced fluids from Hemlock, Middle Kenai "G" & West Foreland oil Pools. Repeals CO 234.	Y
CO	234	1	UNION OIL CO	18-Jun-92	Waiver prod logging requirements for Trading Bay Unit wells M-25, M-27, M-28, M-29, G-32 & K-30RD.	Y
CO	284	0	UNION OIL CO	23-Dec-91	Commingle produced fluids from Middle Kenai "G" and W Foreland Oil Pools w/those from an unidentified pool in the TBU State M-28 wellbore. 3 POOLS	Y
CO	226	0	Union	23-Jan-87	Amends Rule 4 CO 080 to authorize underground injection for enhanced recovery oprns in the McArthur Riv West Forelands Oil Pool.	Y
AIO	5	1	Union	10-Oct-86	Amends Rule 6 of A10 #5.	Y
AIO	5	0	Union	25-Jul-86	Underground injection of fluids for enhanced recovery in McArthur Riv Middle Kenai G, Hemlock and West Forland oil pools in the Trading Bay Unit.	Y
CO	80 A	0	Union	30-Apr-74	Amends Rule 4, CO 080 to allow injection for pressure maintenance in McArthur Riv Middle Kenai "G" Oil Pool.	Y
CO	107	0	Union	14-Sep-71	Authorize commingling of production from Middle Kenai G and the Hemlock Oil Pools in the TBU K-10 well.	Y
CO	80	0	Union	30-Sep-69	Pool rules for McArthur Riv Middle Kenai Gas Pool, McArthur Riv Middle Kenai "G", Hemlock & West Forelands Oil Pools.	Y

MCARTHUR RIVER FIELD

No Pool

Spacing Exception Orders

Order No.		AA	Operator	Date	Description	Current
CO	80	86	UNION OIL CO	22-May-02	SPACING EXCEPTION to drill and complete TBF A-29RD, an injector well that wil be drilled to the northwestern flank of the hemlock structure to support take-off from A-15RD and K-13RD2.	Y
CO	80	84	UNION OIL CO	08-Mar-02	Spacing exception TBF well A-15RDST1L1DP.	Y
CO	80	83	UNION OIL CO	01-Mar-02	Spacing Exception TBF A-29RD.	Y
CO	80	82	UNION OIL CO	16-Jul-01	Spacing exception for TBU K-24RD2 well.	Y
CO	80	81	UNION OIL CO	04-Apr-01	Spacing Exception for TBU K-13RD2 well.	Y
CO	80	80	UNION OIL CO	09-Feb-01	Spacing exception for TBU K-1RD2	Y
CO	80	79	UNION OIL CO	14-Jul-00	spacing exception for TBU G-26RD	Y
CO	80	78	UNION OIL CO	13-Apr-00	Spacing Exception for TBU G-28 RD.	N
CO	80	77	UNION OIL CO	02-Nov-99	Spacing exception for TBU M-32RD well.	Y
CO	80	75	UNION OIL CO	12-Jul-99	Spacing exception for TBU D-31 L1 well.	Y
CO	80	76	UNION OIL CO	12-Jul-99	Spacing exception for TBU D-48 L1 well.	Y
CO	80	74	UNION OIL CO	02-Jul-98	Spacing Exception for TBU D-26RD oil well.	Y
CO	80	73	UNION OIL CO	17-Jun-98	Spacing Exception for TBU G-5RD oil well.	Y
CO	80	72	UNION OIL CO	29-May-98	Spacing exception for TBU G-15RD oil well.	Y
CO	80	71	UNION OIL CO	02-Apr-98	Spacing exception for TBU G-21RD oil well.	Y
CO	80	70	UNION OIL CO	16-Jun-95	Spacing Exception for TBU D-26RD well.	Y
CO	344	0	UNION OIL CO	21-Nov-94	Spacing exception for Trading Bay Unit M-32 development oil well.	Y
CO	80	69	UNION OIL CO	20-Oct-94	Spacing Exception for TBU M-32 well.	Y
CO	80	68	UNION OIL CO	06-Dec-93	Spacing exception for TBU M-31 well.	Y
CO	80	67	UNION OIL CO	20-Oct-93	Spacing exception for TBU K-26 well.	Y
CO	80	66	UNION OIL CO	30-Aug-93	Spacing Exception for TBU K-24RD well.	Y
CO	80	64	UNION OIL CO	29-Dec-92	Spacing Exception for TBU D-7RD #2 well.	Y
CO	80	65	UNION OIL CO	29-Dec-92	Spacing Exception for TBU D-48 well.	Y
CO	80	63	UNION OIL CO	14-May-92	Spacing Exception for TBU G-29RD well.	N
CO	80	62	UNION OIL CO	02-Dec-91	Spacing Exception for TBU G-01RD.	Y
CO	80	61	UNION OIL CO	18-Jul-91	Spacing exception for TBU M-20.	Y
CO	80	60	UNION OIL CO	15-Jul-91	Spacing exception for TBU G-14A-RD.	Y
CO	80	59	UNION OIL CO	12-Jun-91	Spacing Exception for TBU K-8RD2.	Y
CO	80	58	UNION OIL CO	20-Feb-91	Spacing exception for TBU M-29.	Y
CO	80	57	UNION OIL CO	28-Jan-91	Spacing Exception for TBU D-47.	Y
CO	80	56	UNION OIL CO	29-Jan-90	Spacing exception for TBU M-28.	Y
CO	80	55	UNION OIL CO	03-Jan-90	Spacing Exception for TBU G-40.	Y
CO	80	54	UNION OIL CO	30-Jun-89	Spacing Exception for TBU D-46.	Y
CO	80	53	Union	04-Nov-87	spacing exception for TBU M-26.	Y
CO	80	52	Union	26-Aug-87	Spacing exception for TBU M-25.	Y
CO	80	51	Union	23-Dec-85	Spacing Exception for TBU D-43RD.	Y
CO	80	50	Union	12-Jun-85	Spacing exception for TBU D-44.	Y
CO	80	49	Union	09-Jan-85	Spacing exception for TBU D-29RD.	Y

MCARTHUR RIVER FIELD
No Pool

Spacing Exception Orders

Order No.		AA	Operator	Date	Description	Current
CO	80	48	Union	12-Oct-84	Spacing exception for wells TBU K-8RD, G-29 & D-43.	Y
CO	80	47	Union	27-May-83	Spacing Exception for TBU D-35.	Y
CO	80	46	Union	20-May-83	Spacing Exception for TBU D-3RD2.	Y
CO	80	45	Union	29-Mar-83	Spacing Exception for TBU D-42.	Y
CO	80	44	Union	13-Jan-83	Spacing Exception for TBU G-3RD #2.	Y
CO	80	43	Union	01-Jun-82	Spacing Exception for TBU D-40RD.	Y
CO	80	42	Union	22-Apr-82	Spacing exception for TBU G-2RD.	Y
CO	80	41	Union	31-Mar-82	Spacing exception TBU D-4RD.	Y
CO	80	40	Union	18-Mar-82	Spacing Exception for TBU G-6RD.	Y
CO	80	39	Union	11-Dec-81	Spacing Exception for TBU G-4RD.	Y
CO	80	38	Union	19-Feb-81	Spacing Exception for TBU D-17RD.	Y
CO	80	37	Union	04-Dec-80	Spacing Exception for TBU K-3RD.	Y
CO	80	36	Union	01-Oct-80	Spacing exception for TBU D-16RD.	Y
CO	80	35	Union	18-Jul-80	Spacing Exception for TBU D-12RD.	Y
CO	80	34	Union	06-Jun-80	Spacing exception for TBU D-5RD.	Y
CO	80	33	Union	17-Sep-79	Spacing Exception for TBU D-41.	Y
CO	80	32	Union	09-Aug-79	Spacing Exception for TBU K-24.	Y
CO	80	31	Union	11-Jun-79	Spacing Exception for TBU D-29RD.	Y
CO	80	30	Union	19-Apr-79	Spacing exception for TBU D-3RD.	Y
CO	80	28	Union	21-Mar-79	Spacing Exception for TBU G-23RD.	Y
CO	80	27	UNION OIL CO	21-Mar-79	Spacing exception for TBU K-21RD.	Y
CO	80	29	Union	21-Mar-79	Spacing exception for TBU G-34RD.	Y
CO	80	27	UNION OIL CO	27-Feb-79	Spacing Exception for TBU D-34A.	Y
CO	80	26	Union	18-Jan-79	Spacing exception for TBU G-28 well.	Y
CO	80	25	Union	31-Oct-78	Spacing Exception for TBU No. D-25RD.	Y
CO	80	24	Union	11-Jul-78	Spacing Exception for TBU No. K-12RD.	Y
CO	80	23	Union	11-May-78	Spacing exception for TBU G-8RD	Y
CO	80	22	Union	04-Apr-78	Spacing Exception for TBU #K-2RD.	Y
CO	80	21	Union	27-Dec-77	Spacing exception for TBU D-7RD.	Y
CO	80	20	Union	01-Dec-77	Spacing Exception for TBU G-30.	Y
CO	80	19	Union	12-Jul-76	Spacing exception for TBU G-26 well.	Y
CO	80	18	Union	15-Jun-76	Spacing Exception for TBU D-29 well.	Y
CO	80	17	Union	25-Mar-76	Spacing exception for TBU D-28.	Y
CO	80	14	Union	08-Mar-76	Spacing Exception for TBU K-23.	Y
CO	80	16	Union	08-Mar-76	Spacing Exception for TBU K-24.	Y
CO	80	15	Union	08-Mar-76	Spacing Exception for TBU G-24.	Y
CO	80	13	Union	21-Jul-75	Spacing exception for TBU D-2ARD.	Y
CO	80	12	Union	15-May-75	Spacing exception for TBU K-21.	Y
CO	80	11	Union	15-Apr-75	Spacing Exception for TBU D-27.	Y

MCARTHUR RIVER FIELD

No Pool

Spacing Exception Orders

Order No.		AA	Operator	Date	Description	Current
CO	80	10	Union	31-Jan-75	Spacing Exception for TBU K-22.	Y
CO	80	9	Union	23-Dec-74	Spacing Exception for TBU G-23.	Y
CO	80	8	Union	11-Oct-74	Spacing exception for TBU K-10RD.	Y
CO	80	7	Union	03-Jun-74	Spacing exception for TBU D-8RD.	Y
CO	80	6	Union	10-May-74	Spacing Exception for TBU G-21.	Y
CO	80	5	Union	02-May-74	Spacing exception for TBU G-31.	Y
CO	80	3	Union	06-Feb-74	Spacing exception for TBU K-19.	Y
CO	80	4	Union	06-Feb-74	Spacing Exception for TBU D-26.	Y
CO	80	2	Union	22-Jan-74	Spacing Exception for TBU G-21.	Y
CO	80	1	Union	11-May-73	Spacing Exception for TBU K-18.	Y
CO	79	0	Union	20-Aug-69	Spacing exception for TBU K-20 well. MRF	Y
CO	24	0	ARCO ALASKA	28-Jun-66	Spacing exception for McArthur Rv St #1.	N

MCARTHUR RIVER FIELD

No Pool

Obsolete Orders

Order No.		AA	Operator	Date	Description	Current
CO	120	41	UNION OIL CO	31-Aug-90	Flaring excess gas from Grayling Pltfm until 09/10/90.	N
CO	95	20	UNION OIL CO	12-Jun-90	Flaring extended CO 095 to 07/01/91.	N
CO	95	19	UNION OIL CO	21-Jun-89	Flaring extended CO 095 to 07/01/90.	N
CO	120	40	UNION OIL CO	22-Feb-89	Flaring addl 45 excess flare days 1st qtr 1989 TB Prod Fac. If further excess required 1st qtr, AOGCC must meet w/parties to discuss probelm/solution.	
CO	120	39	UNION OIL CO	22-Nov-88	Flaring addl 51 excess flare days 4th qtr '88 TB Prod Fac.	N
CO	120	38	UNION OIL CO	24-Oct-88	Flaring addl 30 excess flare days 4th qtr '88 King Salmon Pltfm.	N
CO	120	37	UNION OIL CO	24-Oct-88	Flaring addl 26 excess flare days 4th qtr '88 TB Prod Fac.	N
CO	120	36	UNION OIL CO	14-Oct-88	Flaring addl 26 excess flare days - Grayling Pltfm.	N
CO	120	35	UNION OIL CO	10-Sep-88	Flaring additional 25 excess flare days 3rd cal qtr,'88 King Salmon Pltfm.	N
CO	120	34	UNION OIL CO	19-Aug-88	Flaring additional 15 excess flare days 3rd cal qtr,'88 King Salmon Pltfm.	N
CO	95	18	UNION OIL CO	03-Jun-88	Flaring entended CO 095 to 07/01/89.	N
CO	114	5	UNION OIL CO	26-Feb-88	Flaring to amend Item 9 to read "2500 MCF per day."	N
CO	120	33	MARATHON OIL	18-Feb-88	Flaring additional 10 excess flare days 1st cal qtr,'88 Dolly Vrdn Pltfm.	N
CO	120	32	MARATHON OIL	04-Feb-88	Flaring additional 10 excess flare days 1st cal qtr,'88 Dolly Vrdn Pltfm.	N
CO	120	31	MARATHON OIL	29-Jan-88	Flaring additional 10 excess flare days 1st cal qtr, Dolly Vrdn Pltfm.	N
CO	234	0	UNION OIL CO	30-Oct-87	Permits commingling fm Middle Kenai "G" & W Foreland Oil Pools. See CO 234A.	N
CO	120	30	MARATHON OIL	14-Aug-87	Flaring up to 15 MMSCF per day 08/11/87 to 09/25/87.	N
CO	114	4	UNION OIL CO	14-Jul-87	Flaring daily avg gas vol 1000 MCF flared on Steelhead Pltfm.	N
CO	95	17	UNION OIL CO	16-Jun-87	Flaring entended CO 095 to 07/01/88.	N
CO	95	16	Union	05-Jun-86	Flaring entended CO 095 to 07/01/87.	N
CO	95	15	Union	01-Jul-85	Flaring entended CO 095 to 07/01/86.	N
CO	120	29	ARCO ALASKA	05-Dec-84	Flaring requested for extension pursuant to CO 120 Rule 2, casinghead gas from McArthur Rv Oil Field, King Salmon Pltfm for more than 15 days per calendar qtr.	N
CO	120	28	ARCO ALASKA	01-Oct-84	Flaring requested for extension pursuant to CO 120 Rule 2,of casinghead gas from McArthur Rv Oil Field, King Salmon Pltfm for more than 15 days per canendar qtr.	N
CO	120	27	MARATHON OIL	28-Jun-84	Flaring requested pursuant to CO 120 Rule 2, of casinghead gas from Dolly Varden Platform for more than 15 days per calendar qtr.	N
CO	120	26	ARCO ALASKA	26-Jun-84	Flaring extended CO 120 Rule 2 of casinghead gas from King Salmon Platform for more then 15 days per calendar qtr.	N
CO	95	14	Union	06-Jun-84	Flaring entended CO 095 to 07/01/85.	N
CO	95	13	Union	20-Jun-83	Flaring 15 days per calendar 1/4. Mid-Kenai Gas Pool.	N
CO	95	12	Union	23-Jun-82	Flaring up to 15 days per calendar 1/4 operating.	N
CO	120	25	ARCO ALASKA	16-Mar-82	Flaring one day extension at King Salmon Platform.	N
CO	120	24	ARCO ALASKA	09-Mar-82	Flaring one day overflare at King Salmon Platform commpressor.	N
CO	120	23	ARCO ALASKA	04-Mar-82	Flaring two days overflare at King Salmon Platform for motor repair.	N

MCARTHUR RIVER FIELD

No Pool

Obsolete Orders

Order No.		AA	Operator	Date	Description	Current
CO	120	22	ARCO ALASKA	03-Feb-82	Flaring an extra 15 days for King Salmon Platform. Production of 18742 39 well.	N
CO	120	21	ARCO ALASKA	08-Dec-81	King Salmon Platform - Flaring extends CO 120 Rule 2, 5 days or until compressor is repaired.	N
CO	120	20	ARCO ALASKA	01-Dec-81	King Salmon Platform - Flaring extends CO 120 Rule 2, 6 days or until compressor is repaired.	N
CO	120	19	Union	27-Nov-81	Grayling Platform - Flaring extends CO 120 Rule 2, 6 days or until compressor is repaired.	N
CO	120	18	ARCO ALASKA	23-Nov-81	Flaring extends CO 120 Rule 2 for 5 days or until compressor is repaired, whichever is first, King Salmon Platform.	N
CO	120	17	ARCO ALASKA	21-Aug-81	Flaring an extra 7 days, King Salmon Platform for compressor repair.	N
CO	120	16	ARCO ALASKA	17-Aug-81	Flaring an extra 6 days, King Salmon Platform for commpressor repair.	N
CO	95	11	Union	10-Jun-81	Flaring up to 15 days per calendar 1/4 UNTIL 07/01/81.	N
CO	95	10	Union	06-Jun-80	Flaring gas up to 15 days per calendar 1/4 until 07/01/81.	N
CO	120	15	ARCO ALASKA	27-Mar-80	Flaring 5 extra days in 1st qtr King Salmon Platform, compressor repairs.	N
CO	120	14	ARCO ALASKA	26-Sep-79	Flaring excess for 5 days, King Salmon Platform	N
CO	120	13	ARCO ALASKA	19-Sep-79	Flaring excess permitted for 5 days.	N
CO	95	9	Union	20-Aug-79	Flaring gas up to 15 days per calendar 1/4 until 07/01/80.	N
CO	120	12	ARCO ALASKA	19-Mar-79	Flaring for remaining of qtr King Salmon Platform for longer than 15 days.	N
CO	120	11	ARCO ALASKA	28-Feb-79	Flaring extended on King Salmon Platform due to overhaul compressor for longer than 15 days per calendar qtr.	N
CO	120	10	MARATHON OIL	30-Jun-78	Flaring excess casinghead gas more than 15 days per calendar qtr Dolly Varden Platform	N
CO	120	9	MARATHON OIL	29-Jun-78	Flaring excess casinghead gas more than 15 days per calendar qtr Dolly Varden Platform	N
CO	95	8	Union	27-Jun-78	Flaring gas up to 15 days per calendar 1/4 until 07/01/79.	N
CO	120	8	MARATHON OIL	08-May-78	Flaring for 25 days in 2nd qtr, Dolly Varden Platform.	N
CO	120	7	MARATHON OIL	01-May-78	Flaring gas longer than 15 days per calendar qtr - Dolly Varden Platform.	N
CO	120	6	ARCO ALASKA	15-Feb-78	King Salmon compressor - Flaring until 03/01/78 for longer than 15 days per calander qtr.	N
CO	120	5	MARATHON OIL	06-Feb-78	Flaring more than 15 days per calendar qtr, Dolly Varden Platform.	N
CO	120	4	ARCO ALASKA	28-Dec-77	Flaring more than 15 days per calendar 1/4 King Salmon Platform.	N
CO	95	7	Union	01-Jul-77	Flaring gas well gas for up to 15 days per calendar 1/4 until 07/01/78.	N
CO	95	6	Union	28-Jan-76	Flaring extended CO 095 until 07/01/77.	N
CO	95	5	Union	17-Jun-74	Flaring extended CO 095 until 07/01/75.	N
CO	120	0	UNION OIL CO	22-Aug-73	Flaring until 09/01/73. Amends CO 103, permits up to 15 days flaring per canendar qtr; requires reports & gives admin powers. 3 POOLS	N
CO	95	4	Union	29-Jun-73	Flaring extended CO 095 until 07/01/74.	N
CO	120	3	Union	31-May-73	Flaring until 09/01/73.	N
CO	120	2	Union	30-Apr-73	Flaring extended until 06/01/73.	N
CO	120	1	Union	23-Mar-73	Flaring until 05/01/73.	N

MCARTHUR RIVER FIELD

No Pool

Obsolete Orders

Order No.		AA	Operator	Date	Description	Current
CO	104 A	1	Union	10-Oct-72	Extends CO 104A to 11/01/72.	N
CO	95 A	0	Union	19-Jul-72	Flaring extended CO 095 to 07/01/73.	N
CO	114	0	Various	09-Jun-72	Flaring restrictions Cook Inlet pltfms & shore facilities. Granite Pt, Trading Bay, McArthur River & MGS Fields. Flaring volume of gas established for safety flares at each pltfm & each shore site. 4 FIELDS	N
CO	104 A	0	Union	08-Jun-72	Flaring until 11/01/72. Restricts flaring after 11/02/72.	N
CO	95	3	Union	24-Feb-72	Flaring extended CO 095 for five days.	N
CO	95	1	Union	19-Oct-71	Flaring extended CO 095 until 07/01/72.	N
CO	104	0	Various	30-Jun-71	Flaring restricted after 07/01/72 except for safety & emergencies.	N
CO	100	0	UNION OIL CO	21-Apr-71	Flaring permitted until 06/30/71. 4 FIELDS	N
CO	95	0	Union	08-Oct-70	Flaring gas lift gas permitted for 30 days in cases of operational necessity. Amends CO 080.	N
CO	94	0	Union	27-Aug-70	Flaring from TBU St K-20 until compressor repaired or 09/11/70.Amends CO 080. Two emergency orders also issued.	N
CO	90	0	Union	12-Mar-70	Emergency order permitting commingling of production.	N
CO	71	0	Union	28-Mar-69	REVOKED by CO 80. Defined Middle Kenai & Hemlock pools.	N
CO	61	0	Union-Mobil	10-May-68	Flaring be permitted on 120 day extension basis. Flaring be permitted on 120 day extension basis. Flaring permitted on 120-day extension basis. 3 FIELDS	N

MCARTHUR RIVER FIELD
HEMLOCK OIL POOL

Current Orders

Order No.		AA	Operator	Date	Description	Current
AIO	5	2	UNION OIL CO	29-Mar-05	Spacing Exception Grayling 40 (PTD 190-003).	Y
AIO	6	3	UNION OIL CO	29-Mar-05	Spacing exception Anna #5 (PTD 167-014).	Y
AIO	5	3	UNION OIL CO	20-Mar-05	Spacing Exception Grayling 40 (PTD 190-003).	Y

MCARTHUR RIVER FIELD
MIDDLE KENAI GAS POOL

Current Orders

Order No.		AA	Operator	Date	Description	Current
CO	228	2	UNION OIL CO	02-Apr-90	Repeals Rule 1b CO 080 as amended by CO 228; reenacts rule to define McArthur Rv Middle Kenai Gas Pool as equivalent to TBU K-2 btwn 1780' & 10128'.	Y
CO	228	1	UNION OIL CO	12-May-88	Amends CO 228 to add Rule 4 re auxiliary csg, cementing & blowout prev equipment. (This rule not in lieu of Rule 2a CO 080.)	Y
CO	228	0	Union	17-Apr-87	Amends CO 080 rule 1(b) Middle Kenai Gas Pool.	Y

MCARTHUR RIVER FIELD
MIDDLE KENAI GAS POOL

Spacing Exception Orders

Order No.		AA	Operator	Date	Description	Current
CO	228	6	UNION OIL CO	28-Oct-03	Spacing Exception to drill and complete the TBU M-16RD Middle Kenai Gas Pool.	Y
CO	228	5	UNION OIL CO	07-Sep-01	Spacing exception for well TBU M-12.	Y
CO	228	4	UNION OIL CO	11-Sep-97	Spacing exception for well Trading Bay Unit M-16.	Y
CO	228	3	UNION OIL CO	22-Jul-96	Spacing exception for well TBU M-3.	Y
CO	228	3	UNION OIL CO	26-Sep-90	Spacing exception for well TBU M-9.	Y

McArthur River, Middle Kenai Gas Pool

Pool Summary

Production from the Middle Kenai Gas Pool began in December 1968 from the Grayling Platform, followed shortly thereafter by production from the Dolly Varden and King Salmon Platforms.[1] The initial production consisted of "wet" gas, which contains appreciable amounts of natural gas liquids produced in association with oil from the West Foreland, Hemlock and Middle Kenai G oil pools. Most of the associated gas produced from McArthur River prior to 1988 was not sold commercially; it was used to fuel lease operations and provide gas lift.[2] In 1988, the Steelhead Platform was constructed to produce "dry" gas (methane) from the Grayling Gas Sands.[3] Production from the pool peaked at 225 billion cubic feet per day in November 1997. During December 2004, production from the platform averaged 92.5 million cubic feet per day.[4] About 4% of the gas from this pool is now used for lease operations,[5] and the remainder is sold commercially.[6]

The Middle Kenai Gas Pool is defined as the accumulation of gas common to, and correlative with, the accumulation found in the Marathon Trading Bay Unit wells between the measured depths of 1,518' in well M-1 to 8,982' in well M-14.[7] The Middle Kenai Gas Pool (also known as Grayling Gas Sands) is located within the Upper Middle Miocene Chuitna and Middle Ground Shoal members of the Tyonek Formation, which are part of the Kenai Group.[8] The reservoir sands occur in a continuous sequence that contains the gas accumulations.[9] As currently defined, the Middle Kenai Gas Pool consists of the Upper A series, Zones A through F, and the G-O series, which lies above the G Zone Oil Pool.[10]

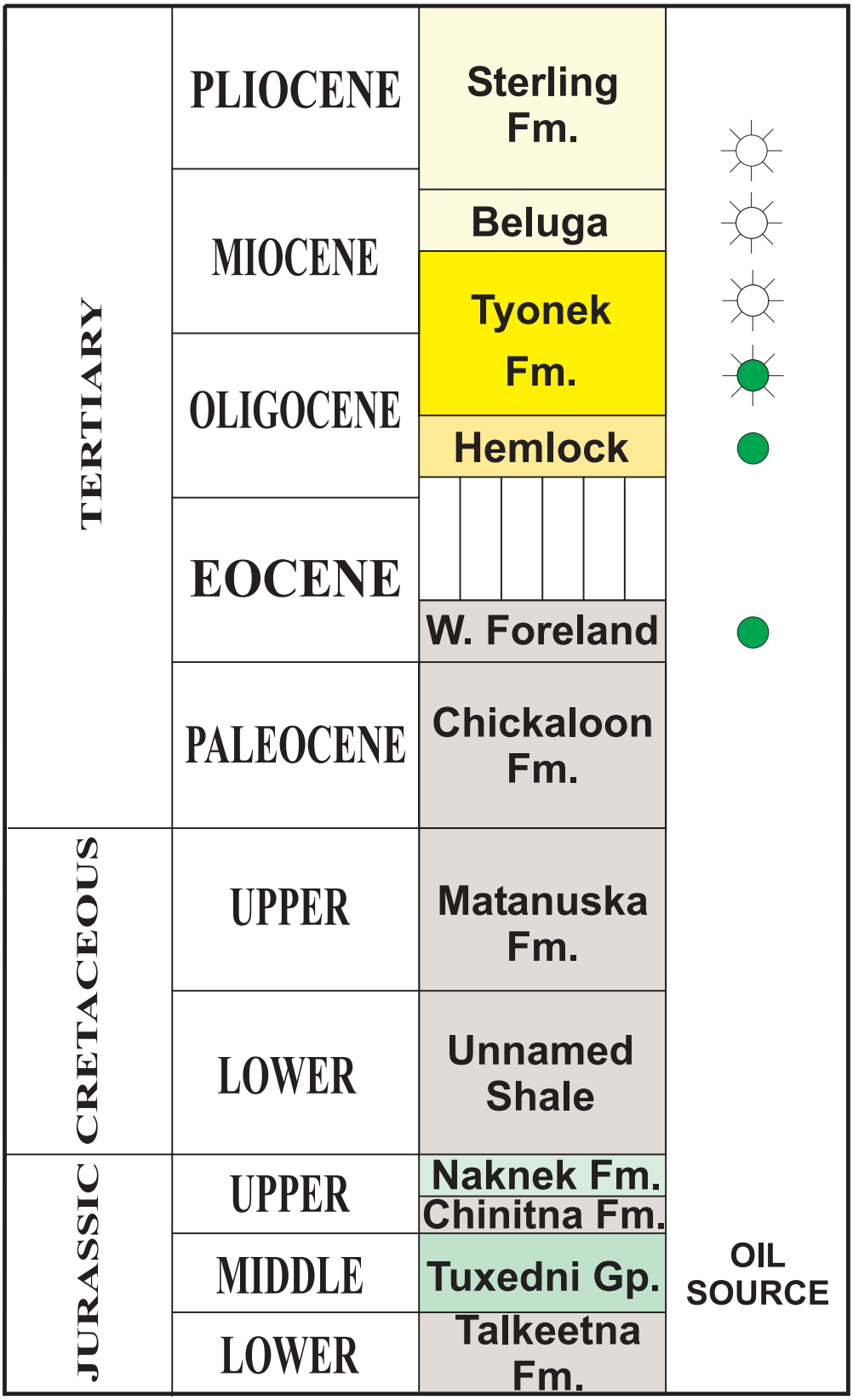
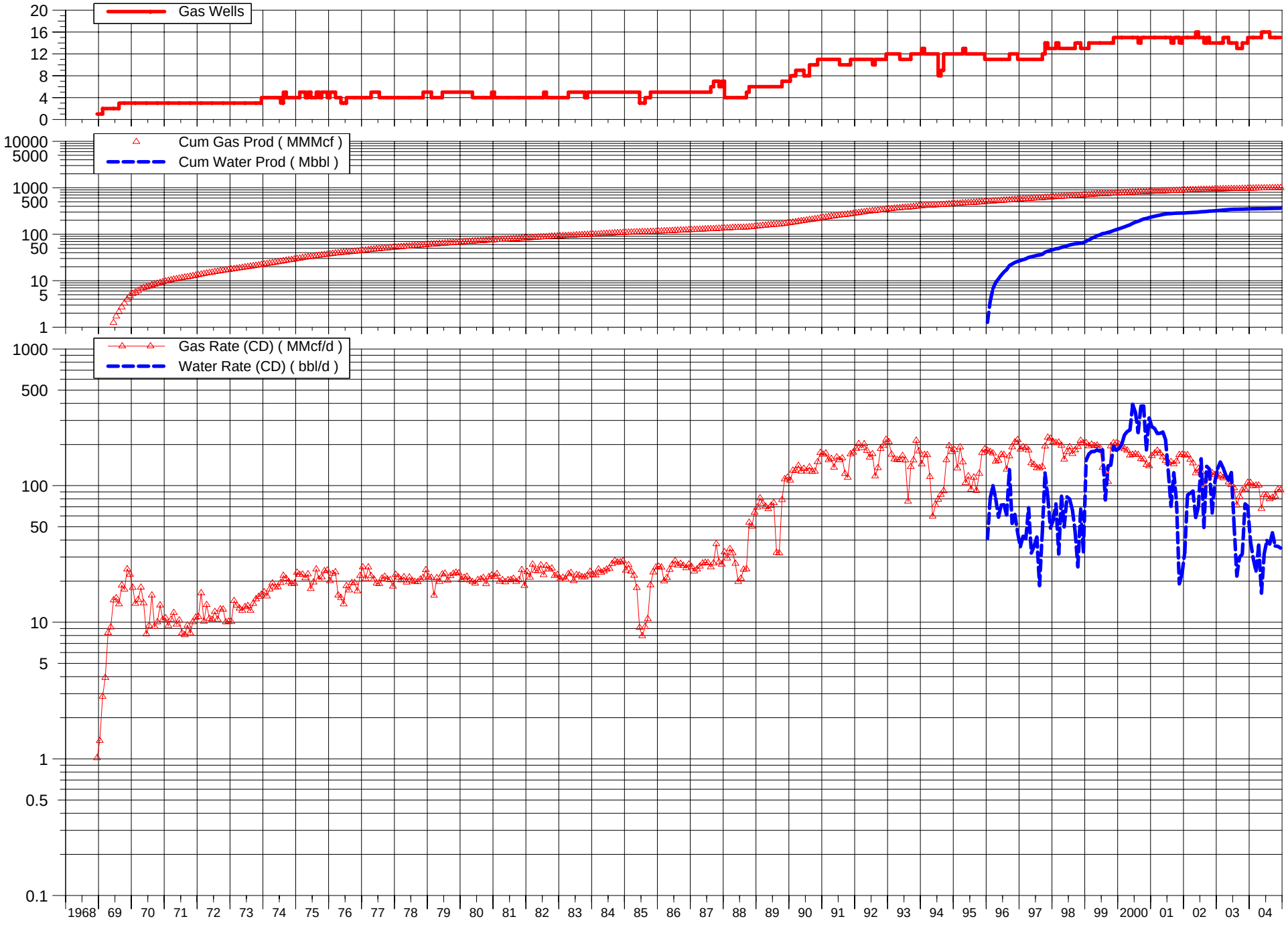
In the vicinity of' the Steelhead Platform, the non-marine sediments of the Middle Kenai Gas Pool were deposited in fluvial-alluvial meander belts. The sand/shale sequences within this portion of the Tyonek Formation are interbedded with distinctive coal layers, suggesting low energy, swamp-like conditions. Sand units are often conglomeratic, generally thin (20 to 50 feet thick), and may not persist laterally. Porosity ranges from 12 to 32 percent. The McArthur River Field structure is an asymmetric anticline that is oriented approximately north 20° east. The structure is cut by two normal faults that do not affect the limits of the hydrocarbon reservoirs.[11]

McArthur River original gas in place is estimated to be 1.35 TCF, with ultimate recovery placed at 1.15 TCF .[12] As of January 2004, proven, unproduced reserves were forecast at 173 billion cubic feet.[13]

---

[1] Alaska Oil and Gas Conservation Commission, 2005, Well and Production Information Database
[2] State of Alaska Department of Administration, Office of Tax Appeals, 1991, Marathon Oil Company, Oil Production Tax, Amended Findings of Fact, Conclusions of Law and Order 1, online at http://www.state.ak.us/admin/ota/marathon.htm
[3] State of Alaska Department of Administration, Office of Tax Appeals, 1991, Marathon Oil Company, Oil Production Tax, Amended Findings of Fact, Conclusions of Law and Order 1, online at http://www.state.ak.us/admin/ota/marathon.htm
[4] Alaska Oil and Gas Conservation Commission, 2005, Well and Production Information Database
[5] Thomas, C.P., Doughty, T.C., Faulder, D.D., and Hite, D.M., 2004, South-Central Alaska Natural Gas Study, U.S. Department of Energy, National Energy Technology Laboratory, Arctic Energy Office, Contract DE-AM26-99FT40575, p. 160.
[6] State of Alaska Department of Administration, Office of Tax Appeals, 1991, Marathon Oil Company, Oil Production Tax, Amended Findings of Fact, Conclusions of Law and Order 1, online at http://www.state.ak.us/admin/ota/marathon.htm
[7] Anderson, R.T., 1990, Trading Bay Unit, State of Alaska, Revised Conservation Orders Nos. 80 and 228; in Alaska Oil and Gas Conservation Commission, 1987, Conservation Order No. 228 File
[8] UNOCAL, 1990, Engineering and Geologic Report, Exhibit A submitted in support of in expanding the Middle Kenai Gas Pool, Conservation Order No. 228
[9] UNOCAL, 1990, Engineering and Geologic Report, Exhibit A submitted in support of in expanding the Middle Kenai Gas Pool, Conservation Order No. 228
[10] UNOCAL, 1990, Engineering and Geologic Report, Exhibit A submitted in support of in expanding the Middle Kenai Gas Pool, Conservation Order No. 228
[11] UNOCAL, 1990, Engineering and Geologic Report, Exhibit A submitted in support of in expanding the Middle Kenai Gas Pool, Conservation Order No. 228
[12] Thomas, C.P., Doughty, T.C., Faulder, D.D., and Hite, D.M., 2004, South-Central Alaska Natural Gas Study, U.S. Department of Energy, National Energy Technology Laboratory, Arctic Energy Office, Contract DE-AM26-99FT40575, p. 166.
[13] Thomas, C.P., Doughty, T.C., Faulder, D.D., and Hite, D.M., 2004, South-Central Alaska Natural Gas Study, U.S. Department of Energy, National Energy Technology Laboratory, Arctic Energy Office, Contract DE-AM26-99FT40575, p. 62.

Cook Inlet Generalized Stratigraphic Column



MCARTHUR RIVER FIELD, MIDDLE KENAI GAS POOL