



TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
<u>WELL: 6607/5-1</u>				
1677-001	2000m	A 65% Sand, fine to coarse grained, subrounded to subangular, mod sorted, white	N9	
		B 35% Silty mudstone, blocky, mod soft, slightly calcareous, medium olive grey	5Y5/1	0.31
1677-002	2050m	A 95% Mudstone, silty, blocky to subplaty, mod soft, slightly calcareous, medium olive grey - light olive grey	5Y5/1- 5Y6/1	0.59
		B 5% Sand, as 1677-001A	N9	
1677-003	2100m	A 65% Mudstone, as 1677-002A	5Y5/1- 5Y6/1	0.54
		B 35% Sand, as 1677-001A	N9	
1677-004	2150m	A 98% Mudstone, slightly silty, blocky to subplaty, mod soft, very slightly calcareous, light olive grey	5Y6/1	0.73,0.72
1677-005	2200m	A 98% Mudstone, as 1677-004A	5Y6/1	0.73
1677-006	2250m	A 98% Silty mudstone, blocky to subplaty, mod soft, slightly calcareous, light olive grey - medium yellowish grey	5Y6/1- 5Y7/1	0.55
1677-007	2300m	A 98% Silty mudstone, as 1677-006A	5Y6/1- 5Y7/1	0.56
1677-008	2350m	A 98% Silty mudstone, blocky to subplaty, mod soft, slightly calcareous, light olive grey - medium olive grey	5Y6/1- 5Y5/1	0.66
1677-009	2400m	A 90% Silty mudstone, as 1677-008A	5Y6/1- 5Y5/1	0.99,0.99
		B 10% Siltstone, blocky to subplaty, mod soft, calcareous, dark bluish white - yellowish grey	5B8/1- 5Y8/1	0.86
1677-010	2480m	A 70% Mudstone, slightly silty in part, platy, mod hard, non calcareous, light bluish grey	5B7/1	0.26
		B 15% Limestone, chalky, blocky, soft, white	N9	0.10
		C 15% Silty mudstone, blocky to subplaty, mod soft, non calcareous, moderate yellowish brown Minor crystalline limestone	10YR5/2	1.65
1677-011	2510m	A 60% Mudstone, slightly silty in part, subplaty, mod soft, non calcareous, medium grey	N5	0.79
		B 30% Mudstone, as 1677-010A	5B7/1	0.18
		C 10% Silty mudstone, as 1677-010C Minor limestone	10YR5/2	2.14



TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1677-012	2540m	A 95% Mudstone, slightly silty in part, subplaty, mod soft, non calcareous, medium olive grey	5Y5/1	1.00
		B 5% Mudstone, as 1677-011A Significant cavings	N5	
1677-013	2570m	A 98% Mudstone, as 1677-012A Trace sandstone	5Y5/1	0.89,0.89
1677-014	2600m	A 98% Mudstone, slightly silty in part, subplaty, mod soft, non calcareous, occasionally pyritic, medium olive grey	5Y5/1	0.94
1677-015	2630m	A 98% Mudstone, as 1677-014A Minor siltstone Trace Limestone	5Y5/1	0.92
1677-016	2660m	A 85% Mudstone, slightly silty in part, subplaty, mod soft, non calcareous, medium grey - medium light grey	N5-N6	1.05,1.06
		B 15% Siltstone, grading to very fine grained sandstone, subplaty, mod soft, non calcareous, very light grey - dark bluish white	N8-5B8/1	0.69
1677-017	2680m	A 85% Mudstone, as 1677-016A	N5-N6	1.06
		B 15% Siltstone, as 1677-016B	N8-5B8/1	0.74
1677-018	2690m	A 90% Mudstone, as 1677-016A	N5-N6	1.05
		B 10% Siltstone, as 1677-016B	N8-5B8/1	0.76
1677-019	2700m	A 95% Mudstone, slightly silty in part, platy to subplaty, mod soft, non calcareous, light olive grey - medium light grey	5Y6/1-N6	1.06
		B 5% Siltstone, grading to very fine grained sandstone, subplaty, mod soft, non calcareous, very light grey - dark bluish white	N8-5B8/1	0.73
1677-020	2710m	A 90% Mudstone, slightly silty in part, platy to subplaty, mod soft, non calcareous, medium light grey - light olive grey	N6-5Y6/1	1.01,1.01
		B 10% Siltstone, grading to silty mudstone, subplaty to blocky, mod soft, non calcareous, yellowish grey	5Y8/1	0.81
1677-021	2720m	A 98% Mudstone, as 1677-020A Minor siltstone	N6-5Y6/1	1.07



TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1677-022	2730m	A 98% Mudstone, as 1677-020A Minor siltstone	N6-5Y6/1	1.02
1677-023	2740m	A 95% Mudstone, slightly silty in part, platy to subplaty, mod soft, non calcareous, light olive grey	5Y6/1	1.05
		B 5% Siltstone, grading to very fine grained sandstone, subplaty, mod soft, non calcareous, slightly glaucanitic, medium yellowish grey - light grey	5Y7/1-N7	0.81
1677-024	2750m	A 95% Mudstone, as 1677-023A	5Y6/1	1.06
		B 5% Siltstone, as 1677-023B	5Y7/1-N7	0.69
1677-025	2760m	A 98% Mudstone, as 1677-023A Minor siltstone	5Y6/1	1.09
1677-026	2770m	A 98% Mudstone, occasionally slightly silty, subplaty, mod soft, non calcareous, medium light grey - medium olive grey	N6-5Y5/1	1.05
1677-027	2780m	A 98% Mudstone, as 1677-026A Minor limestone	N6-5Y5/1	1.03
1677-028	2810m	A 98% Mudstone, as 1677-026A Minor siltstone, trace limestone	N6-5Y5/1	0.99,0.97
1677-029	2840m	A 98% Mudstone, slightly silty in part, platy to subplaty, mod soft, non calcareous, medium grey - medium light grey Trace siltstone	N5-N6	0.95
1677-030	2870m	A 90% Mudstone, as 1677-029A B 10% LCM - metal Minor dolomite	N5-N6	1.00
1677-031	2900m	A 75% LCM - cement B 25% Mudstone, occasionally slightly silty, subplaty, mod soft, non calcareous, medium olive grey	5Y5/1	1.02
1677-032	2930m	A 98% Mudstone, as 1677-031B Trace sandstone, LCM	5Y5/1	1.16
1677-033	2960m	A 95% Mudstone, as 1677-031B	5Y5/1	1.14,1.15
		B 5% Siltstone, subplaty, mod hard, non calcareous, very light grey	N8	0.85
1677-034	3000m	A 80% Mudstone, generally silty, subplaty to blocky, mod soft, non calcareous, medium olive grey B 20% Sand, fine to medium grained, subangular, mod sorted, white	5Y5/1 N9	1.15



TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1677-035	3050m	A 90% Mudstone, silty in part, subplaty, mod soft, non calcareous, medium olive grey	5Y5/1	1.13, 1.15
		B 10% Sand, as 1677-034B	N9	
1677-036	3100m	A 70% Sand, medium to coarse grained, subangular to subrounded, mod sorted, white	N9	
		B 30% Mudstone, as 1677-035A	5Y5/1	1.06
1677-037	3150m	A 60% Mudstone, often silty, subplaty, mod soft, non calcareous, medium olive grey	5Y5/1	1.17
		B 40% Sand, fine to medium grained, subangular to subrounded, mod to fairly well sorted, white	N9	
1677-038	3200m	A 95% Mudstone, slightly silty in part, subplaty to platy, mod soft, non calcareous, medium olive grey	5Y5/1	0.86
		B 5% LCM - metal Trace sandstone		
1677-039	3250m	A 95% Mudstone, slightly silty in part, subplaty, mod soft, non calcareous, olive grey - medium dark grey	5Y4/1-N4	0.94
		B 5% LCM - metal Minor sand, LCM - cement		
1677-040	3300m	A 95% Mudstone, as 1677-039A	5Y4/1-N4	0.89, 0.94
		B 5% LCM - metal Minor sand		
1677-041	3350m	A 95% Mudstone, as 1677-039A	5Y4/1-N4	0.89
		B 5% LCM - metal Minor siltstone		
1677-042	3400m	A 95% Mudstone, often silty, platy to subplaty, mod soft, non calcareous, medium olive grey - olive grey	5Y5/1- 5Y4/1	1.02
		B 5% LCM - metal Minor siltstone		
1677-043	3450m	A 85% Mudstone, as 1677-042A	5Y5/1- 5Y4/1	0.84
		B 10% Siltstone, grading to very fine grained sandstone, platy to subplaty, mod soft, non calcareous to slightly calcareous, very light grey	N8	0.33
		C 5% LCM - metal Minor limestone		



TABLE 1
ORGANIC CARBON RESULTS AND GROSS LITHOLOGIC DESCRIPTIONS

GEOCHEM SAMPLE NUMBER	DEPTH	GROSS LITHOLOGIC DESCRIPTION	G S A Colour Code	TOTAL ORGANIC CARBON (Wt. % of Rock)
1677-044	3500m	A 85% Mudstone, silty in part, platy to subplaty, mod soft, non calcareous, medium olive grey - olive grey B 15% LCM - additive(?), metal	5Y5/1- 5Y4/1	0.86
1677-045	3550m	A 80% Mudstone, as 1677-044A B 20% LCM - additive(?), metal Minor siltstone	5Y5/1- 5Y4/1	0.86
1677-046	3600m	A 60% Mudstone, as 1677-044A B 30% LCM - metal C 10% Siltstone, grading to very fine grained sandstone, subplaty, mod soft, non to slightly calcareous, very light grey	5Y5/1- 5Y4/1 N8	0.85 0.32
1677-047	3650m	A 60% Siltstone, as 1677-046C B 30% Mudstone, slightly silty in part, subplaty, mod soft, non calcareous, olive grey - medium olive grey C 10% LCM - metal	N8 5Y4/1- 5Y5/1	0.27 0.86
1677-048	3700m	A 75% Mudstone, slightly silty in part, platy to subplaty, mod soft to mod hard, non calcareous, medium dark grey - olive grey B 25% LCM - metal, additive(?) Trace sandstone	N4-5Y4/1	0.93
1677-049	3750m	A 65% Mudstone, as 1677-048A B 25% LCM - metal, additive(?) C 10% Siltstone, grading to very fine grained sandstone, subplaty, mod soft, slightly calcareous, very light grey	N4-5Y4/1 N8	0.86 0.38
1677-050	3800m	A 35% LCM - metal B 25% Siltstone, as 1677-049C C 25% Sand, fine to medium grained, subrounded to subangular, mod sorted, white - very pale orange D 15% Mudstone, as 1677-048A	N8 N9- 10YR8/2 N4-5Y4/1	0.35 0.89, 0.89

TABLE 2A
CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS IN HEAD SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1677-001	2000	2360	19	11	1	7	2398	38	1.6	16	0.14
1677-002	2050	3944	45	19	6	2	4016	72	1.8	41	3.00
1677-003	2100	2866	33	17	5	4	2925	59	2.0	37	1.25
1677-004	2150	2130	16	13	3	4	2166	36	1.7	14	0.75
1677-005	2200	2757	21	26	10	14	2828	71	2.5	112	0.71
1677-006	2250	1924	27	25	6	7	1989	65	3.3	37	0.86
1677-007	2300	2452	28	33	11	6	2530	78	3.1	27	1.83
1677-008	2350	9450	138	75	29	20	9712	262	2.7	82	1.45
1677-009	2400	2544	123	49	14	6	2736	192	7.0	22	2.33
1677-010	2480	3281	275	88	26	18	3688	407	11.0	91	1.44
1677-011	2510	2574	241	23	6	3	2847	273	9.6	24	2.00
1677-012	2540	1961	233	22	6	3	2225	264	11.9	26	2.00
1677-013	2570	4481	263	18	3	4	4769	288	6.0	18	0.75
1677-014	2600	2267	269	14	2	2	2554	287	11.2	8	1.00
1677-015	2630	3487	346	19	3	3	3858	371	9.6	17	1.00
1677-016	2660	6311	1408	79	10	7	7815	1504	19.2	14	1.43
1677-017	2680	1472	60	5	1	1	1539	67	4.4	10	1.00
1677-018	2690	6481	1020	58	7	6	7572	1091	14.4	17	1.17
1677-019	2700	947	93	9	1	4	1054	107	10.2	9	0.25
1677-020	2710	4319	171	21	7	22	4540	221	4.9	91	0.32
1677-021	2720	1336	192	11	1	2	1542	206	13.4	5	0.50
1677-022	2730	1811	344	21	3	4	2183	372	17.0	7	0.75
1677-023	2740	890	65	5	1	1	962	72	7.5	6	1.00
1677-024	2750	195	17	2	1	2	217	22	10.1	16	0.50
1677-025	2760	5427	592	41	36	3	6099	672	11.0	11	*.**
1677-026	2770	1812	230	27	3	4	2076	264	12.7	11	0.75
1677-027	2780	864	119	19	4	6	1012	148	14.6	4	0.67
1677-028	2810	4160	832	126	10	14	5142	982	19.1	13	0.71
1677-029	2840	1388	199	43	5	6	1641	253	15.4	4	0.83
1677-030	2870	1616	248	67	12	6	1949	333	17.1	6	2.00



TABLE 2A
 CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS IN HEAD SPACE GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1677-031	2900	658	104	73	44	49	928	270	29.1	40	0.90
1677-032	2930	3020	433	165	79	83	3780	760	20.1	37	0.95
1677-033	2960	1172	184	69	31	29	1485	313	21.1	17	1.07
1677-034	3000	4793	548	268	150	153	5912	1119	18.9	117	0.98
1677-035	3050	2549	468	133	46	7	3203	654	20.4	15	6.57
1677-036	3100	2972	497	206	87	21	3783	811	21.4	39	4.14
1677-037	3150	1119	220	162	101	39	1641	522	31.8	86	2.59
1677-038	3200	803	125	92	50	37	1107	304	27.5	81	1.35
1677-039	3250	1047	234	318	191	241	2031	984	48.4	600	0.79
1677-040	3300	167	63	77	50	79	436	269	61.7	168	0.63
1677-041	3350	884	215	366	202	282	1949	1065	54.6	563	0.72
1677-042	3400	699	181	239	99	125	1343	644	48.0	172	0.79
1677-043	3450	1307	339	439	155	211	2451	1144	46.7	308	0.73
1677-044	3500	1667	511	623	234	388	3423	1756	51.3	624	0.60
1677-045	3550	317	160	170	67	120	834	517	62.0	213	0.56
1677-046	3600	1740	546	647	182	275	3390	1650	48.7	378	0.66
1677-047	3650	971	286	281	73	98	1709	738	43.2	114	0.74
1677-048	3700	6430	1786	1779	461	645	11101	4671	42.1	861	0.71
1677-049	3750	298	149	131	36	69	683	385	56.4	94	0.52
1677-050	3800	136	84	53	11	34	318	182	57.2	49	0.32



TABLE 2B
CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1677-001	2000	785	16	8	2	5	816	31	3.8	33	0.40
1677-002	2050	270	8	7	2	5	292	22	7.5	52	0.40
1677-003	2100	1645	13	13	4	5	1680	35	2.1	28	0.80
1677-004	2150	160	13	34	29	37	273	113	41.4	183	0.78
1677-005	2200	1218	13	13	2	2	1248	30	2.4	35	1.00
1677-006	2250	295	6	10	3	4	318	23	7.2	38	0.75
1677-007	2300	803	14	9	4	3	833	30	3.6	43	1.33
1677-008	2350	138	5	3	2	2	150	12	8.0	43	1.00
1677-009	2400	6735	110	40	13	9	6907	172	2.5	76	1.44
1677-010	2480	1655	23	13	8	13	1712	57	3.3	255	0.62
1677-011	2510	620	46	13	9	21	709	89	12.6	118	0.43
1677-012	2540	514	56	14	9	21	614	100	16.3	135	0.43
1677-013	2570	6107	229	18	4	4	6362	255	4.0	32	1.00
1677-014	2600	4647	199	26	7	8	4887	240	4.9	38	0.88
1677-015	2630	4027	189	24	7	9	4256	229	5.4	42	0.78
1677-016	2660	1388	84	12	2	3	1489	101	6.8	23	0.67
1677-017	2680	5755	294	32	7	9	6097	342	5.6	29	0.78
1677-018	2690	819	65	13	3	4	904	85	9.4	29	0.75
1677-019	2700	721	85	22	5	14	847	126	14.9	124	0.36
1677-020	2710	146	37	18	5	9	215	69	32.1	31	0.56
1677-021	2720	6492	588	51	6	9	7146	654	9.2	24	0.67
1677-022	2730	1113	224	32	4	8	1381	268	19.4	24	0.50
1677-023	2740	693	130	22	2	5	852	159	18.7	17	0.40
1677-024	2750	423	147	31	7	9	617	194	31.4	57	0.78
1677-025	2760	1470	198	41	5	10	1724	254	14.7	48	0.50
1677-026	2770	186	30	9	6	8	239	53	22.2	34	0.75
1677-027	2780	4545	418	78	5	11	5057	512	10.1	15	0.45
1677-028	2810	610	109	43	4	9	775	165	21.3	17	0.44
1677-029	2840	1544	203	66	10	12	1835	291	15.9	16	0.83
1677-030	2870	218	54	35	5	7	319	101	31.7	16	0.71

TABLE 2B
CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS IN CUTTING GAS

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1677-031	2900	1423	127	59	39	43	1691	268	15.8	47	0.91
1677-032	2930	304	63	65	31	7	470	166	35.3	30	4.43
1677-033	2960	547	145	158	64	12	926	379	40.9	23	5.33
1677-034	3000	103	25	34	20	6	188	85	45.2	31	3.33
1677-035	3050	601	186	134	57	16	994	393	39.5	37	3.56
1677-036	3100	159	42	57	28	13	299	140	46.8	37	2.15
1677-037	3150	456	78	73	49	36	692	236	34.1	117	1.36
1677-038	3200	105	27	51	32	46	261	156	59.8	151	0.70
1677-039	3250	153	58	80	59	95	445	292	65.6	382	0.62
1677-040	3300	76	29	36	14	51	206	130	63.1	405	0.27
1677-041	3350	1024	212	299	133	184	1852	828	44.7	532	0.72
1677-042	3400	151	53	98	31	98	431	280	65.0	390	0.32
1677-043	3450	312	112	169	59	141	793	481	60.7	429	0.42
1677-044	3500	94	31	44	13	50	232	138	59.5	260	0.26
1677-045	3550	424	138	179	57	97	895	471	52.6	253	0.59
1677-046	3600	131	54	89	22	73	369	238	64.5	289	0.30
1677-047	3650	290	115	170	39	110	724	434	59.9	232	0.35
1677-048	3700	1799	583	539	128	222	3271	1472	45.0	271	0.58
1677-049	3750	129	79	64	12	55	339	210	61.9	173	0.22
1677-050	3800	60	32	24	9	29	154	94	61.0	125	0.31

TABLE 2 C
TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS (2A + 2B)

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1677-001	2000	3145	35	19	3	12	3214	69	2.1	50	0.25
1677-002	2050	4214	53	26	8	7	4308	94	2.2	93	1.14
1677-003	2100	4511	46	30	9	9	4605	94	2.0	65	1.00
1677-004	2150	2290	29	47	32	41	2439	149	6.1	197	0.78
1677-005	2200	3975	34	39	12	16	4076	101	2.5	146	0.75
1677-006	2250	2219	33	35	9	11	2307	88	3.8	75	0.82
1677-007	2300	3255	42	42	15	9	3363	108	3.2	70	1.67
1677-008	2350	9588	143	78	31	22	9862	274	2.8	125	1.41
1677-009	2400	9279	233	89	27	15	9643	364	3.8	98	1.80
1677-010	2480	4936	298	101	34	31	5400	464	8.6	346	1.10
1677-011	2510	3194	287	36	15	24	3556	362	10.2	143	0.63
1677-012	2540	2475	289	36	15	24	2839	364	12.8	160	0.63
1677-013	2570	10588	492	36	7	8	11131	543	4.9	50	0.88
1677-014	2600	6914	468	40	9	10	7441	527	7.1	46	0.90
1677-015	2630	7514	535	43	10	12	8114	600	7.4	59	0.83
1677-016	2660	7699	1492	91	12	10	9304	1605	17.3	37	1.20
1677-017	2680	7227	354	37	8	10	7636	409	5.4	39	0.80
1677-018	2690	7300	1085	71	10	10	8476	1176	13.9	45	1.00
1677-019	2700	1668	178	31	6	18	1901	233	12.3	133	0.33
1677-020	2710	4465	208	39	12	31	4755	290	6.1	123	0.39
1677-021	2720	7828	780	62	7	11	8688	860	9.9	30	0.64
1677-022	2730	2924	568	53	7	12	3564	640	18.0	31	0.58
1677-023	2740	1583	195	27	3	6	1814	231	12.7	23	0.50
1677-024	2750	618	164	33	8	11	834	216	25.9	74	0.73
1677-025	2760	6897	790	82	41	13	7823	926	11.8	59	3.15
1677-026	2770	1998	260	36	9	12	2315	317	13.7	45	0.75
1677-027	2780	5409	537	97	9	17	6069	660	10.9	20	0.53
1677-028	2810	4770	941	169	14	23	5917	1147	19.4	30	0.61
1677-029	2840	2932	402	109	15	18	3476	544	15.7	21	0.83
1677-030	2870	1834	302	102	17	13	2268	434	19.1	22	1.31

TABLE 2C
TOTAL CONCENTRATION (VOL. PPM OF ROCK) OF C₁ - C₇ HYDROCARBONS (A + B)

GEOCHEM SAMPLE NUMBER	DEPTH	C ₁ Methane	C ₂ Ethane	C ₃ Propane	iC ₄ Isobutane	nC ₄ Butane	TOTAL C ₁ - C ₄	TOTAL C ₂ - C ₄	% GAS WETNESS	TOTAL C ₅ - C ₇	$\frac{iC_4}{nC_4}$
1677-031	2900	2081	231	132	83	92	2619	538	20.5	87	0.90
1677-032	2930	3324	496	230	110	90	4250	926	21.8	67	1.22
1677-033	2960	1719	329	227	95	41	2411	692	28.7	40	2.32
1677-034	3000	4896	573	302	170	159	6100	1204	19.7	148	1.07
1677-035	3050	3150	654	267	103	23	4197	1047	24.9	52	4.48
1677-036	3100	3131	539	263	115	34	4082	951	23.3	76	3.38
1677-037	3150	1575	298	235	150	75	2333	758	32.5	202	2.00
1677-038	3200	908	152	143	82	83	1368	460	33.6	232	0.99
1677-039	3250	1200	292	398	250	336	2476	1276	51.5	982	0.74
1677-040	3300	243	92	113	64	130	642	399	62.1	573	0.49
1677-041	3350	1908	427	665	335	466	3801	1893	49.8	1095	0.72
1677-042	3400	850	234	337	130	223	1774	924	52.1	562	0.58
1677-043	3450	1619	451	608	214	352	3244	1625	50.1	737	0.61
1677-044	3500	1761	542	667	247	438	3655	1894	51.8	883	0.56
1677-045	3550	741	298	349	124	217	1729	988	57.1	466	0.57
1677-046	3600	1871	600	736	204	348	3759	1888	50.2	667	0.59
1677-047	3650	1261	401	451	112	208	2433	1172	48.2	346	0.54
1677-048	3700	8229	2369	2318	589	867	14372	6143	42.7	1132	0.68
1677-049	3750	427	228	195	48	124	1022	595	58.2	267	0.39
1677-050	3800	196	116	77	20	63	472	276	58.5	173	0.32



TABLE 3
DETAILED GASOLINE (C4-C7) ANALYSIS

GEOCHEM SAMPLE NUMBER	005	008	013	019	036	039
DEPTH	2200	2350	2570	2700	3100	3250
isobutane	0.72	0.59	2.62	2.03	6.72	2.08
n-butane	5.54	6.88	8.45	6.42	8.20	5.13
isopentane	4.48	3.20	4.83	3.81	11.85	8.13
n-pentane	9.22	26.94	40.06	53.86	34.33	16.16
2,2-dimethylB	1.77	3.00	1.48	0.91	2.55	1.12
cyclopentane(CP)	2.26	2.80	1.22	1.54	2.12	1.94
2,3-dimethylB	0.00	0.00	0.00	0.00	0.00	0.00
2-methylP	5.65	5.89	4.08	2.40	3.62	6.76
3-methylP	3.83	5.57	2.28	1.50	4.57	3.64
n-hexane	5.37	11.62	7.55	5.53	5.18	11.49
methylCP(MCP)	3.98	3.57	3.45	3.55	4.14	5.39
2,2-dimethylP	2.76	0.76	1.26	0.44	2.90	1.82
2,4-dimethylP	0.00	0.00	0.00	0.00	0.00	0.00
2,2,3-trimethylB	0.00	0.00	0.00	0.00	0.00	0.00
benzene	5.02	2.30	1.29	2.47	0.54	0.30
cyclohexane(CH)	5.77	3.19	1.71	2.74	2.72	6.26
3,3-dimethylP	0.00	0.00	0.00	0.00	0.00	0.00
1,1-dimethylCP	0.00	0.00	0.00	0.00	0.00	0.00
2-methylH	4.56	5.26	2.70	2.74	3.61	4.02
2,3-dimethylP	0.00	0.00	0.00	0.00	0.00	0.00
3-methylH	3.15	2.03	0.82	1.29	0.92	2.00
1,c,3-dimethylCP	2.16	1.41	1.12	0.41	0.68	1.44
1,t,3-dimethylCP	1.15	1.22	0.97	2.00	0.46	1.01
1,t,2-dimethylCP	1.68	2.57	2.41	1.29	1.23	3.27
3-ethylP	0.00	0.00	0.00	0.00	0.00	0.00
n-heptane	6.00	5.20	3.49	3.06	0.76	6.44
methylCH(MCH)	17.44	4.25	4.59	1.65	2.46	11.11
1,c,2-dimethylCP	0.00	0.00	0.00	0.00	0.00	0.00
toluene	7.48	1.75	3.62	0.39	0.44	0.49
ABUNDANCE	69	35	35	61	161	559
nC7/C7nap x100	26.74	54.97	38.44	57.21	15.82	38.29
MCP/Bz	0.79	1.55	2.68	1.44	7.71	18.11
MH/DMCP	1.55	1.40	0.78	1.09	1.92	1.05
nC6/MCP	1.35	3.25	2.19	1.56	1.25	2.13
%n-PARAFFINS	26.13	50.63	59.55	68.87	48.47	39.24
%iso-PARAFFINS	26.93	26.30	20.07	15.11	36.74	29.57
% NAPHTHENES	34.44	19.01	15.47	13.17	13.81	30.41
% AROMATICS	12.50	4.05	4.90	2.85	0.98	0.78

TABLE 3
DETAILED GASOLINE (C4-C7) ANALYSIS

GEOCHEM SAMPLE NUMBER	041	044	048
DEPTH	3350	3500	3700
isobutane	2.29	1.69	5.10
n-butane	5.65	7.81	7.67
isopentane	62.72	6.87	8.21
n-pentane	11.59	17.57	10.02
2,2-dimethylB	0.45	1.83	0.47
cyclopentane(CP)	0.46	1.95	2.96
2,3-dimethylB	0.00	0.00	0.00
2-methylP	0.79	5.21	7.04
3-methylP	1.44	2.91	3.94
n-hexane	8.34	11.00	9.45
methylCP(MCP)	0.77	5.95	8.67
2,2-dimethylP	0.50	0.79	0.81
2,4-dimethylP	0.00	0.00	0.27
2,2,3-trimethylB	0.00	0.00	0.00
benzene	0.28	0.27	0.14
cyclohexane(CH)	0.58	6.89	9.00
3,3-dimethylP	0.00	0.00	0.00
1,1-dimethylCP	0.00	0.00	0.00
2-methylH	0.24	3.75	2.83
2,3-dimethylP	0.00	0.00	0.00
3-methylH	0.20	1.60	1.47
1,c,3-dimethylCP	0.33	1.30	1.42
1,t,3-dimethylCP	0.35	1.06	1.18
1,t,2-dimethylCP	0.36	2.20	3.11
3-ethylP	0.00	0.00	0.00
n-heptane	1.00	5.45	3.06
methylCH(MCH)	1.36	12.92	12.46
1,c,2-dimethylCP	0.00	0.00	0.00
toluene	0.30	0.99	0.72
ABUNDANCE	137	269	1157
nC7/C7nap x100	41.49	31.18	16.85
MCP/Bz	2.80	22.04	61.18
MH/DMCP	0.42	1.17	0.75
nC6/MCP	10.76	1.85	1.09
%n-PARAFFINS	26.57	41.84	30.20
%iso-PARAFFINS	68.63	24.63	30.14
% NAPHTHENES	4.22	32.27	38.80
% AROMATICS	0.58	1.26	0.86

TABLE 4

ROCKEVAL PYROLYSIS DATA

GEOCHEM SAMPLE NUMBER	DEPTH	TOC (%)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Production INDEX	Hydrogen INDEX	Oxygen INDEX	Tmax (° C)
1677-001B	2000	0.31	0.11	0.28	2.11	0.28	90.3	680.6	412
1677-002A	2050	0.59	0.22	0.82	3.17	0.21	139.0	537.3	422
1677-003A	2100	0.54	0.23	0.74	2.57	0.24	137.0	475.9	423
1677-004A	2150	0.72	0.18	1.14	3.02	0.14	158.3	419.4	427
1677-005A	2200	0.73	0.18	1.19	4.40	0.13	163.0	602.7	425
1677-006A	2250	0.55	0.19	0.66	4.66	0.22	120.0	847.3	410
1677-007A	2300	0.56	0.16	0.60	2.74	0.21	107.1	489.3	409
1677-008A	2350	0.66	0.20	0.85	3.03	0.19	128.8	459.1	415
1677-009A	2400	0.99	0.22	1.39	3.30	0.14	140.4	333.3	418
1677-010A	2480	0.26	0.21	0.41	1.35	0.34	157.7	519.2	409
1677-010C	2480	1.65	0.68	2.74	1.80	0.20	166.1	109.1	422
1677-011A	2510	0.79	0.26	0.98	1.88	0.21	124.1	238.0	421
1677-011C	2510	2.14	0.36	4.44	2.71	0.07	207.5	126.6	419
1677-012A	2540	1.00	0.16	0.86	2.24	0.16	86.0	224.0	425
1677-013A	2570	0.89	0.10	0.57	2.28	0.15	64.0	256.2	423
1677-014A	2600	0.94	0.07	0.68	2.58	0.09	72.3	274.5	426
1677-015A	2630	0.92	0.10	0.75	2.19	0.12	81.5	238.0	428
1677-016A	2660	1.05	0.19	0.97	1.98	0.16	92.4	188.6	423
1677-017A	2680	1.06	0.26	1.23	2.58	0.17	116.0	243.4	429
1677-018A	2690	1.05	0.04	1.10	2.84	0.04	104.8	270.5	431
1677-019A	2700	1.06	0.08	1.19	4.76	0.06	112.3	449.1	432
1677-020A	2710	1.01	0.10	1.52	6.53	0.06	150.5	646.5	430
1677-021A	2720	1.07	0.08	1.65	4.50	0.05	154.2	420.6	433
1677-022A	2730	1.02	0.07	1.43	5.70	0.05	140.2	558.8	433
1677-023A	2740	1.05	0.04	1.56	5.54	0.02	148.6	527.6	430
1677-024A	2750	1.06	0.07	1.31	2.79	0.05	123.6	263.2	432
1677-025A	2760	1.09	0.06	1.32	1.61	0.04	121.1	147.7	428
1677-026A	2770	1.05	0.07	1.43	4.41	0.05	136.2	420.0	433
1677-027A	2780	1.03	0.14	1.45	4.09	0.09	140.8	397.1	434
1677-028A	2810	0.98	1.17	1.23	4.32	0.49	125.5	440.8	432
1677-029A	2840	0.95	0.09	1.24	3.67	0.07	130.5	386.3	431
1677-030A	2870	1.00	0.09	1.07	3.07	0.08	107.0	307.0	432
1677-031B	2900	1.02	0.06	1.21	3.37	0.05	118.6	330.4	432
1677-032A	2930	1.16	0.13	2.00	2.77	0.06	172.4	238.8	431
1677-033A	2960	1.14	0.08	1.47	1.95	0.05	128.9	171.1	431
1677-034A	3000	1.15	0.13	1.71	2.06	0.07	148.7	179.1	432
1677-035A	3050	1.14	0.08	1.72	1.82	0.04	150.9	159.6	431
1677-036B	3100	1.06	0.10	1.27	2.39	0.07	119.8	225.5	434
1677-037A	3150	1.17	0.16	1.80	3.10	0.08	153.8	265.0	431
1677-038A	3200	0.86	0.14	1.08	1.83	0.11	125.6	212.8	431
1677-039A	3250	0.94	0.19	1.33	2.23	0.13	141.5	237.2	429
1677-040A	3300	0.92	0.18	1.07	2.31	0.14	116.3	251.1	429
1677-041A	3350	0.89	0.18	0.75	2.03	0.19	84.3	228.1	431
1677-042A	3400	1.02	0.43	1.30	2.44	0.25	127.5	239.2	432
1677-043A	3450	0.84	0.18	1.04	1.86	0.15	123.8	221.4	430
1677-044A	3500	0.86	0.21	1.00	2.21	0.17	116.3	257.0	428
1677-045A	3550	0.86	0.04	1.02	2.18	0.04	118.6	253.5	429
1677-046A	3600	0.85	0.18	1.00	1.70	0.15	117.6	200.0	433
1677-047A	3650	0.27	0.04	0.28	1.88	0.13	103.7	696.3	431
1677-047B	3650	0.86	0.15	0.84	1.66	0.15	97.7	193.0	431

TABLE 4

ROCKEVAL PYROLYSIS DATA

GEOCHEM SAMPLE NUMBER	DEPTH	TOC (%)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	Production INDEX	Hydrogen INDEX	Oxygen INDEX	Tmax (°C)
1677-048A	3700	0.93	0.19	0.91	1.51	0.17	97.8	162.4	431
1677-049A	3750	0.86	0.16	1.10	2.64	0.13	127.9	307.0	432

TABLE 5
GAS - OIL INDEX



GEOCHEM SAMPLE NUMBER	DEPTH	DRY GAS	WET GAS	GASOLINES KEROSENES	GAS OIL DISTILLATE	GAS-OIL INDEX
		% C ₁	% C ₂ - C ₅	% C ₆ - C ₁₄	% C ₁₅₊	$\frac{\% C_1 - C_5}{\text{TOTAL}}$

1677-005A	2200	13.85	34.30	51.85	0.00	48.15
1677-010C	2480	16.40	29.77	53.48	0.36	46.17
1677-011C	2510	17.44	31.00	51.56	0.00	48.44
1677-012A	2540	18.10	32.76	49.14	0.00	50.86
1677-017A	2680	14.96	31.35	53.23	0.46	46.31
1677-021A	2720	23.21	30.79	46.00	0.00	54.00
1677-027A	2780	28.94	25.77	44.75	0.54	54.71
1677-032A	2930	27.77	20.84	50.88	0.50	48.62
1677-037A	3150	26.32	34.41	39.27	0.00	60.73
1677-046A	3600	21.42	25.30	53.29	0.00	46.71

TABLE 6
KEROGEN TYPE AND MATURATION

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION					THERMAL MATURATION	
		TYPES > 35%; 10-35%; < 10%	REMARKS	RE- WORKED (%)	PARTICLE SIZE	PRESERV- ATION	THERMAL ALTERATION INDEX	1-10 SCALE
<u>WELL 6607/5-1</u>								
1677-001B	2000m	W; I-H-Al; (Am)		-	F-M	G	1+ to 2-	2
1677-002A	2050m	W; I-H-Al; Am		-	F-M	G	1+ to 2-	2
1677-003A	2100m	W; I-Al-H; Am		-	F-M	G	1+ to 2-	2
1677-004A	2150m	-; W-I-H-Al; Am		-	F-M	G	1+ to 2-	2
1677-005A	2200m	-; W-I-Al-H; Am		-	F-M	F-G	1+ to 2-	2
1677-006A	2250m	-; W-I-Al-H; Am		-	F-M	F-G	1+ to 2-	2
1677-007A	2300m	-; I-W-Al -H; (Am)		-	F-M	F	1+ to 2-	2
1677-008A	2350m	-; W-Al-I-H; Am		-	F-M	F-G	1+ to 2-	2
1677-009A	2400m	W; Al-H-I; Am	differentiation difficult	-	F-M	G	1+ to 2-	2
1677-010C	2480m	-; W-Al-H-I; Am	differentiation difficult, organic matter frequently partially degraded	-	M	G	1+ to 2-(?)	2(?)
1677-011A	2510m	-; I-W-H-Al; Am	differentiation difficult	-	F-M	F	1+ to 2-	2
1677-012A	2540m	I; W-H; Al-Am	minor material at 1+ to 2-/2-	-	M	G	2- max	3
1677-013A	2570m	I; W-Al-H; (Am)	good H at 2- and 2- to 2	-	M	G	1+ to 2-	2.5
1677-014A	2600m	I; W-Al-H; -	H at 2- (dominant) and 2- to 2	-	M	G	1+ to 2-/2-	2.7
1677-015A	2630m	I; W-Al-H; (Am)	dominant H marginally mature virtually 2-	-	M	G	1+ to 2-/2-	2.9
1677-016A	2660m	I; W-H-Al; Am	dominant H at 2- and 2- to 2 virtually 2-	-	M	G	1+ to 2-/2-	2.9

Algal, Amorphous, Herbaceous, Inertinite, Resin, Wood

preservation = Poor, Fair, Good size = Fine, Medium, Coarse

TA1 SCALE 1 | 1+ to 2- | 2- | 2 | 2 to 2+ | 2+ to 3- | 3 | 3+ | 4 | 5
1-10 SCALE 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10



TABLE 6
KEROGEN TYPE AND MATURATION

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION					THERMAL MATURATION	
		TYPES > 35%; 10-35%; < 10%	REMARKS	RE- WORKED (%)	PARTICLE SIZE	PRESERV- ATION	THERMAL ALTERATION INDEX	1-10 SCALE
1677-017A	2680m	I;W-H-Al;Am	dominant H marginally mature virtually 2-	-	M	G	1+ to 2-/2-	2.9
1677-018A	2690m	I;W-Al-H; (Am)	H at 2- and 2- to 2	-	M	G	1+ to 2-	2.5
1677-019A	2700m	-;I-W-Al-H; (Am)	H at 2- and 2- to 2	-	M	G	1+ to 2-	2.5
1677-020A	2710m	I;W-Al-H; (Am)	H at 2- and 2- to 2	-	M	G	1+ to 2-/2-	2.7
1677-021A	2720m	-;I-W-Al-H;Am	good H at 2- and 2- to 2	-	M	G	1+ to 2-	2.7
1677-022A	2730m	-;I-W-Al;H-Am	minor H at 2- to 2 very close to 2-	-	M	G	1+ to 2-	2.7
1677-023A	2740m	I;W-Al;H-Am	H at 2- and 2- to 2	-	M	G	1+ to 2-	2.7
1677-024A	2750m	-;I-W-Al-H;Am	H at 2- and 2- to 2	-	M	G	1+ to 2-	2.7
1677-025A	2760m	I;W-Al-H;Am	H at 2- to 2, dominant H at 2-	-	M	G	1+ to 2-	2.7
1677-026A	2770m	-;I-W-Al;H-Am	dominant H marginally mature	-	F-M	G	1+ to 2-	2.7
1677-027A	2780m	I;W-Al-H;Am	dominant H at 2- virtually 2-	-	F-M	G	1+ to 2-/2-	2.9
1677-028A	2810m	I;W-Al-H;Am		-	F-M	G	2-	3
1677-029A	2840m	I;W-Al-H;Am		-	M	G	2-	3
1677-030A	2870m	I;W-Al-H;Am	cavings H at 2- to 2	-	F-M	G	2-	3
1677-031B	2900m	I;W-H-Al; (Am)	H at 2- to 2	-	F-M	G	2-	3
1677-032A	2930m	I;W-Al-H;Am	H at 2- to 2	-	F-M	G	2-	3

Algal, Amorphous, Herbaceous, Inertinite, Resin, Wood

preservation = Poor, Fair, Good size = Fine, Medium, Coarse

TAI SCALE 1 | 1+ to 2- | 2- | 2 | 2 to 2+ | 2+ to 3- | 3 | 3+ | 4 | 5
1-10 SCALE 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10



TABLE 6
KEROGEN TYPE AND MATURATION

GEOCHEM SAMPLE NUMBER	DEPTH	ORGANIC MATTER DESCRIPTION				THERMAL MATURATION		
		TYPES > 35%; 10-35%; < 10%	REMARKS	RE- WORKED (%)	PARTICLE SIZE	PRESERV- ATION	THERMAL ALTERATION INDEX	1 - 10 SCALE
1677-033A	2960m	I;W-Al-H;Am		-	M	G	2-	3
1677-034A	3000m	I;W-Al-H;Am		-	M-C	F-G	2-	3
1677-035A	3050m	-;I-W-Al-H;Am	Minor cavings	-	F-M	F-G	2-	3
1677-036B	3100m	I-W;H-Al;Am		-	F-M	G	2-	3
1677-037A	3150m	I;W-H-Al;Am		-	F-M	G	2-	3
1677-038A	3200m	I;W-H-Al;-		-	F-M	G	2-/2- to 2	3.2
1677-039A	3250m	I;W-H-Al;-		-	F-M	G	2- to 2	3.5
1677-040A	3300m	I;W;H-Al		-	F-M	G	2- to 2	3.5
1677-041A	3350m	I;W;H-Al		-	F-M	G	2- to 2	3.5
1677-042A	3400m	I-W;H-Al;-		-	M	G	2- to 2	3.5
1677-043A	3450m	I-W;Al-H;-		-	F-M	G	2- to 2	3.5
1677-044A	3500m	I-W;H;Al		-	F-M	F-G	2- to 2	3.5
1677-045A	3550m	I-W;-;Al-H		-	M	F-G	2- to 2	3.5
1677-046A	3600m	I-W;-;Al-H		-	F-M	F-G	2- to 2	3.5
1677-047B	3650m	I-W;-;Al-H		-	M	F-G	2- to 2	3.5
1677-048A	3700m	W-I;Al-H;(Am)		-	M	G	2- to 2	3.5
1677-049A	3750m	I-W;-;H-Al		-	M	F-G	2 max	4
1677-050D	3800m	W-I;Al-H;(Am)	Significant cavings?	-	M	G	2- to 2	3.7

Algal, Amorphous, Herbaceous, Inertinite, Resin, Wood

preservation = Poor, Fair, Good size = Fine, Medium, Coarse

TA1 SCALE 1 | 1+ to 2- | 2- | 2 | 2 to 2+ | 2+ to 3- | 3 | 3+ | 4 | 5
1 - 10 SCALE 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10





TABLE 7
VITRINITE REFLECTANCE DATA

GEOCHEM SAMPLE NUMBER	DEPTH	SAMPLE TYPE	AVERAGE REFLECTIVITY R _o (%), (NUMBER OF PARTICLES)			REMARKS
			1	2	3	

Well 6607/5-1

1677-001B	2000m	WR	<u>0.32</u> (2)			
1677-002A	2050m	WR	0.28 (7)	0.43 (2)	0.58 (1)	
1677-003A	2100m	WR	<u>0.35</u> (2)	0.48 (1)	0.62 (1)	
1677-004A	2150m	WR	<u>0.31</u> (4)	0.45 (2)		
1677-005A	2200m	WR	0.55 (2)			
1677-006A	2250m	WR	<u>0.33</u> (5)	0.48 (1)		
1677-007A	2300m	WR	0.44 (2)			
1677-008A	2350m	WR	0.50 (1)			
1677-009A	2400m	WR	0.28 (3)	0.48 (1)		
1677-010C	2480m	WR	0.46 (1)			
1677-011A	2510m	WR	<u>0.38</u> (1)			
1677-012A	2540m	WR	0.42 (1)			
1677-013A	2570m	WR	<u>0.38</u> (1)	0.51 (5)	0.60 (3)	
1677-014A	2600m	WR	0.50 (27)			
1677-015A	2630m	WR	0.62 (3)	0.85 (1)		
1677-016A	2660m	WR	0.52 (12)	0.61 (8)		
1677-017A	2680m	WR	0.36 (1)	0.59 (6)	0.80 (1)	
1677-018A	2690m	WR	0.36 (5)	0.60 (12)	0.82 (10)	
1677-019A	2700m	WR	<u>0.46</u> (4)	0.58 (14)	0.72 (3)	
1677-020A	2710m	WR	0.55 (6)	0.67 (6)	0.78 (4)	
1677-021A	2720m	WR	0.61 (18)	0.84 (1)	1.00 (1)	
1677-022A	2730m	WR	<u>0.41</u> (2)	0.56 (18)		
1677-023A	2740m	WR	0.40 (1)	0.51 (6)	0.68 (1)	
1677-024A	2750m	WR	0.52 (20)	0.67 (2)		
1677-025A	2760m	WR	0.53 (11)	0.69 (4)		
1677-026A	2770m	WR	0.40 (2)	0.61 (21)	0.80 (7)	
1677-027A	2780m	WR	0.58 (9)			
1677-028A	2810m	WR	<u>0.47</u> (4)	0.63 (2)		
1677-029A	2840m	WR	0.42 (1)	0.63 (9)	0.82 (5)	
1677-030A	2870m	WR	<u>0.44</u> (2)	0.70 (1)		
1677-031B	2900m	WR	0.42 (4)	0.56 (4)		
1677-032A	2930m	WR	0.57 (17)	0.75 (8)		
1677-033A	2960m	WR	<u>0.48</u> (2)	0.62 (6)	0.79 (2)	
1677-034A	3000m	WR	<u>0.49</u> (8)	0.75 (5)		



TABLE 7
VITRINITE REFLECTANCE DATA

GEOCHEM SAMPLE NUMBER	DEPTH	SAMPLE TYPE	AVERAGE REFLECTIVITY R _o (%), (NUMBER OF PARTICLES)			REMARKS
			1	2	3	
1677-035A	3050m	WR	0.61 (5)	0.71 (6)	0.80 (1)	
1677-036B	3100m	WR	0.54 (3)	0.67 (6)	0.78 (2)	
1677-037A	3150m	WR	0.28 (1)	0.45 (6)	0.69 (3)	
1677-038A	3200m	WR	0.38 (3)	0.54 (5)	0.70 (9)	
1677-039A	3250m	WR	<u>0.52 (6)</u>	0.70 (16)	0.93 (2)	
1677-040A	3300m	WR	<u>0.56 (13)</u>	0.76 (4)		
1677-041A	3350m	WR	0.40 (2)	0.63 (11)	0.82 (1)	
1677-042A	3400m	WR	0.49 (4)	0.62 (13)	0.80 (4)	
1677-043A	3450m	WR	0.71 (4)			
1677-044A	3500m	WR	0.45 (5)	0.64 (12)	0.84 (2)	
1677-045A	3550m	WR	0.53 (7)	0.66 (3)		
1677-046A	3600m	WR	0.56 (15)	0.75 (5)		
1677-047B	3650m	WR	<u>0.64 (19)</u>	0.81 (6)		
1677-048A	3700m	WR	<u>0.63 (12)</u>	0.82 (7)		
1677-049A	3750m	WR	<u>0.65 (3)</u>	0.86 (2)		
1677-050D	3800m	WR	0.49 (2)	0.68 (1)	0.86 (3)	



TABLE 8a
CONCENTRATION (PPM) OF EXTRACTED C₁₅₊ MATERIAL IN ROCK

JOB GEOCHEM SAMPLE NUMBER	LITHO	DEPTH	TOTAL EXTRACT	HYDROCARBONS			NON HYDROCARBONS			
				Saturates	Aromatics	TOTAL	Precipd. Asphaltenes	Eluted NSO's	Non-eluted NSO's	TOTAL
1677-005A		2200	316	45	6	51	62	201	1	265
1677-008A		2350	409	33	4	37	250	121	1	372
1677-013A		2570	305	37	8	44	173	87	1	261
1677-019A		2700	328	39	6	45	107	176	1	283
1677-028A		2810	222	35	11	46	94	82	1	176
1677-036A		3100	129	32	6	38	46	45	1	92
1677-039A		3250	446	38	10	48	331	66	1	397
1677-041A		3350	278	28	6	34	159	84	1	244
1677-044A		3500	514	85	16	100	230	183	1	414
1677-048A		3700	223	46	16	62	113	47	1	161



TABLE 8b
COMPOSITION (NORMALISED %) OF C₁₅₊ MATERIAL

JOB	LITHO	DEPTH	HYDROCARBONS		NON HYDROCARBONS		
GEOCHEM SAMPLE NUMBER			Saturates	Aromatics	Preciptd. Asphaltenes	Eluted NSO's	Non eluted NSO's

1677-005A		2200	14.19	1.86	19.77	63.72	0.47
1677-008A		2350	8.11	1.01	61.15	29.56	0.17
1677-013A		2570	11.97	2.58	56.81	28.40	0.23
1677-019A		2700	11.76	1.89	32.56	53.57	0.21
1677-028A		2810	15.72	5.02	42.14	36.79	0.33
1677-036A		3100	24.88	4.31	35.89	34.45	0.48
1677-039A		3250	8.55	2.30	74.18	14.80	0.16
1677-041A		3350	10.09	2.24	57.17	30.27	0.22
1677-044A		3500	16.43	3.06	44.71	35.54	0.25
1677-048A		3700	20.47	7.31	50.88	21.05	0.29



TABLE 9
SIGNIFICANT RATIOS (%) OF C₁₅₊ FRACTIONS AND ORGANIC CARBON

JOB	LITHO	DEPTH	ORGANIC CARBON (wt. %)	HYDROCARBONS		TOTAL EXTRACT ORG. CARBON	SATURATES AROMATICS
GEOCHEM SAMPLE NUMBER				TOTAL EXTRACT	ORG. CARBON		
1677-005A		2200	0.60	16.05	0.84	5.26	7.62
1677-008A		2350	0.58	9.12	0.64	7.05	8.00
1677-013A		2570	0.77	14.55	0.58	3.96	4.64
1677-019A		2700	1.00	13.66	0.45	3.28	6.22
1677-028A		2810	0.91	20.74	0.51	2.44	3.13
1677-036A		3100	0.08	29.19	4.72	16.16	5.78
1677-039A		3250	0.83	10.86	0.58	5.37	3.71
1677-041A		3350	0.58	12.33	0.59	4.79	4.50
1677-044A		3500	0.78	19.49	1.29	6.60	5.38
1677-048A		3700	0.89	27.78	0.69	2.50	2.80



TABLE 10
COMPOSITION (NORMALISED %) OF C₁₅₊ SATURATE (PARAFFIN - NAPHTHENE) HYDROCARBONS

GEOCHEM SAMPLE NUMBER	005A	008A	013A	019A	028A	
DEPTH	2200	2350	2570	2700	2810	
SAMPLE TYPE						
nC15	Unreliable, see saturates chromatogram	2.21	3.08	1.57	13.76	
nC16		1.70	3.14	1.10	12.40	
nC17		2.98	4.48	1.65	10.73	
nC18		4.77	5.69	3.30	10.53	
nC19		7.15	6.76	4.71	7.30	
nC20		8.94	7.16	6.04	5.73	
nC21		9.79	8.29	8.24	4.69	
nC22		11.06	8.36	9.81	5.32	
nC23		10.81	8.16	9.81	4.27	
nC24		8.43	8.03	7.77	4.27	
nC25		6.72	6.15	7.38	4.06	
nC26		5.87	5.75	5.81	2.92	
nC27		4.51	5.69	5.65	3.13	
nC28		4.00	3.88	9.50	2.92	
nC29		3.40	4.75	4.95	3.34	
nC30		2.21	2.81	3.53	3.13	
nC31		1.79	3.14	3.14	0.83	
nC32		1.19	1.67	2.04	0.21	
nC33		1.02	1.40	1.88	0.21	
nC34		0.94	0.94	1.33	0.10	
nC35		0.51	0.67	0.78	0.16	
Paraffin		46.41	44.83	39.37	40.75	
Isoprenoid		1.66	3.30	1.30	4.88	
Naphthene		51.94	51.87	59.33	54.36	
CPI 1 Index			1.01	1.03	1.00	0.97
CPI 2 Index			1.02	1.18	0.90	1.05
CPI 3 Index			0.91	1.18	0.74	1.07
Prist/Phytane			0.75	2.14	0.91	1.40
Prist/nC17			0.51	1.12	0.95	0.65
Phytane/nC18			0.43	0.41	0.52	0.48

$$C.P.I. 1 = \frac{1}{2} \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{20}+C_{22}+C_{24}+C_{26}} + \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{22}+C_{24}+C_{26}+C_{28}}$$

Job Number : 1677

$$C.P.I. 2 = \frac{1}{2} \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{24}+C_{26}+C_{28}+C_{30}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{26}+C_{28}+C_{30}+C_{32}}$$

$$C.P.I. 3 = \frac{2x (C_{27})}{C_{26}+C_{28}}$$



TABLE 10
COMPOSITION (NORMALISED %) OF C₁₅₊ SATURATE (PARAFFIN - NAPHTHENE) HYDROCARBONS

GEOCHEM SAMPLE NUMBER	036A	039A	041A	044A	048A
DEPTH	3100	3250	3350	3500	3700
SAMPLE TYPE					
nC15	9.74	0.19	1.16	7.26	9.12
nC16	4.33	0.47	1.37	7.76	9.57
nC17	4.11	1.22	2.53	10.38	13.01
nC18	5.52	2.64	3.79	11.05	11.46
nC19	4.65	4.99	5.79	9.96	9.23
nC20	6.06	7.06	8.42	9.45	9.01
nC21	6.93	9.70	11.68	8.61	8.23
nC22	7.03	11.39	12.84	7.59	6.67
nC23	7.47	12.24	12.74	6.67	5.23
nC24	6.17	9.70	9.79	4.89	3.89
nC25	5.52	8.29	7.68	3.88	3.56
nC26	4.55	6.50	5.47	2.70	2.00
nC27	4.33	6.12	4.53	2.19	2.45
nC28	5.19	5.08	3.89	1.86	1.00
nC29	4.76	4.14	2.84	1.77	1.67
nC30	3.90	3.01	1.68	1.27	1.22
nC31	3.36	2.35	1.37	0.84	0.78
nC32	2.16	1.51	0.63	0.51	0.33
nC33	1.95	1.41	0.74	0.51	1.11
nC34	1.30	1.22	0.53	0.42	0.22
nC35	0.97	0.75	0.53	0.42	0.22
Paraffin	35.50	47.60	46.57	39.20	31.72
Isoprenoid	1.31	0.85	1.96	3.90	5.12
Naphtene	63.20	51.55	51.47	56.90	63.16
CPI 1 Index	1.04	1.08	1.07	1.06	1.17
CPI 2 Index	1.02	1.08	1.10	1.09	1.45
CPI 3 Index	0.89	1.06	0.97	0.96	1.63
Prist/Phytane	1.00	0.46	1.00	1.81	3.83
Prist/nC17	0.45	0.46	0.83	0.62	0.98
Phytane/nC18	0.33	0.46	0.56	0.32	0.29

$$C.P.I. 1 = \frac{1}{2} \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{20}+C_{22}+C_{24}+C_{26}} + \frac{C_{21}+C_{23}+C_{25}+C_{27}}{C_{22}+C_{24}+C_{26}+C_{28}}$$

Job Number : 1677

$$C.P.I. 2 = \frac{1}{2} \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{24}+C_{26}+C_{28}+C_{30}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}}{C_{26}+C_{28}+C_{30}+C_{32}}$$

$$C.P.I. 3 = \frac{2x (C_{27})}{C_{26}+C_{28}}$$

U-549

3

GEOSERVICES
MUD LOGGING

87-1717 - BA
07 DES. 1987
REGISTRARAT
OLJEDIREKTORATET

GEOCHEMICAL ANALYSIS

WELL 6607/5-1 ESSO Norge

FINAL REPORT

INTRODUCTION TO OIL SHOW ANALYZER

MEASURED PARAMETERS

The operational mode of the pyrolysis cycle is a crucible series having the ordered sequence of Standard (1), Blank (1) followed by samples. This series may be followed by other samples on a second carriage to give eight hours of continuous operation. This optional additional carriage easily attaches to the first to provide sixteen hours of unattended analysis, that is a 48-crucible series.

The measured parameters of each analysis run consist of four curves (S_0 , S_1 , S_2 , S_4) and a maximum temperature value (T_{max}):

- S_0 : the area of the S_0 curve gives the quantity of gas contained in the rock sample in mg. hydrocarbons / g rock.
- S_1 : the area of S_1 curve gives the quantity of oil contained in the rock sample in mg. hydrocarbons / g rock.
- S_2 : the area of the S_2 curve gives the quantity of hydrocarbons produced by thermal conversion of kerogen contained in the rock sample in mg. hydrocarbons / g rock.
- S_4 : the area of the S_4 curve gives the quantity of organic CO_2 produced during catalytic oxidation of the residual organic matter contained in the rock sample in mg CO_2 / g rock.
- T_{max} : the maximum temperature is the value in °C which maximum generation of hydrocarbons from kerogen occurs as it relates to the S_2 curve. Some analysis will give a multi-peak S_2 curve due to the presence of varied types of kerogens. As to these analyses, only the peak corresponding to the highest temperature will be evaluated to obtain the T_{max} value.

The microprocessor-controlled OIL SHOW ANALYZER provides results which are graphically presented on a printer plotter in the form of a pyrogram data, summary tables and geochemical logs (figure 3).

RESULTS INTERPRETATION

How do these parameters help finding oil ?

The S_2 value is indicative of source rock quality :

- poor source rock : $S_2 < 2$ mg/g
- fair source rock : $2 < S_2 < 5$ mg/g
- good source rock : $S_2 > 5$ mg/g

The organic matter maturation degree is defined by T_{max} :

- $T_{max} < 430^\circ\text{C}$ Immature zone
- $430^\circ\text{C} < T_{max} < 465^\circ\text{C}$ Oil zone
- $T_{max} > 465^\circ\text{C}$ Gas zone

T_{max} is a function of burial depth and may be correlated to other standard such as vitrinite reflectance.

The measured parameters are used to derive specific information to rapidly identify and evaluate petroleum source-rock during drilling operations. These parameters are obtained through one of four pyrolysis cycles which differ as to purge sequence, initial isotherm, temperature gradient and final pyrolysis temperature. Specific cycle feature are outlined in figure F.

Interpretation of O.S.A. data provides the following information. Measures parameters values allow computation of the results : G.P.I., O.F.I., T.P.I., T.O.C. and H.I.

Production indices

$$\text{Gas production index : G.P.I.} = \frac{S_0}{S_0 + S_1 + S_2}$$

$$\text{Oil production index : O.F.I.} = \frac{S_1}{S_0 + S_1 + S_2}$$

$$\text{Total production index : T.P.I.} = \frac{S_0 + S_1}{S_0 + S_1 + S_2}$$

Migration of hydrocarbons can be illustrated through the plot of G.P.I. and O.P.I. - Thus an accumulation can be detected by higher values than they should be at the evolutionary stage. That is to say, migration phenomena can be explained by positive or negative variations of these productions indices (for example, interpretation of gas shows in the mud becomes easier).

Total organic carbon evaluation

The TOC content of the rock sample is calculated from the sum of residual organic carbon (CO₂ from S₄ peak) and pyrolysed organic carbon (82% of the quantity S₀ + S₁ + S₂). The CO₂ resulting from the cracking of kerogen during pyrolysis is not taken into account to evaluate TOC.

The main interest of the TOC log to the user is the ability to detect gas source rocks in deep gas wells. In fact, at such levels, the organic matter can't produce hydrocarbons anymore during pyrolysis.

Thus, these boreholes are characterized by negligible (S₁ + S₂) values.

Hydrogen Index

H.I. is calculated from the value $\frac{100 \cdot S_2}{\text{TOC}}$ with S₂ expressed in mg hydrocarbons / g rock, TOC in % (by weight).

Types of organic matter can be estimated and differentiated by means of a T_{max} - H.I. diagram (figure 5).