

Statoil

PETROLEUM TECHNOLOGY

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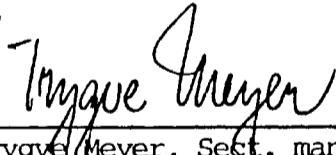
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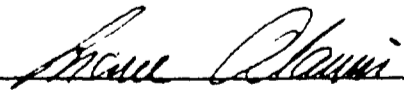
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| Abstract <p>The sequence from 1200 to 2600 m RKB was evaluated in this well. Apart from interbedded source rocks with potential for oil and gas, the penetrated sedimentary sections were poor source rocks for minor gas generation. The Upper Jurassic Nesna formation was not present in the well. Thermal maturity evaluation indicated immature sediments on the structure. Shows of medium gravity crude oil were detected within the upper part of the Flatøy group, and shows of wet gas/condensate were found below 2000+ metres RKB in the Skomvær group. The above hydrocarbons were generated from source rocks with similar organic facies but at lower maturity than the sources for the hydrocarbons found in the Tomma and Aldra reservoir sandstones. The Tomma formation contained hydrocarbons were biodegradation/water washing has occurred but where this bacterial and water washing process has not kept pace with the feeding of fresh oil. The Aldra formation reservoir contained viscous and severely biodegraded/water washed oil with API gravity in the range 23 - 25°. The GOC and OWC were found at approximately 2307 + and 2480 + metres RKB, respectively.</p> |
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|---|
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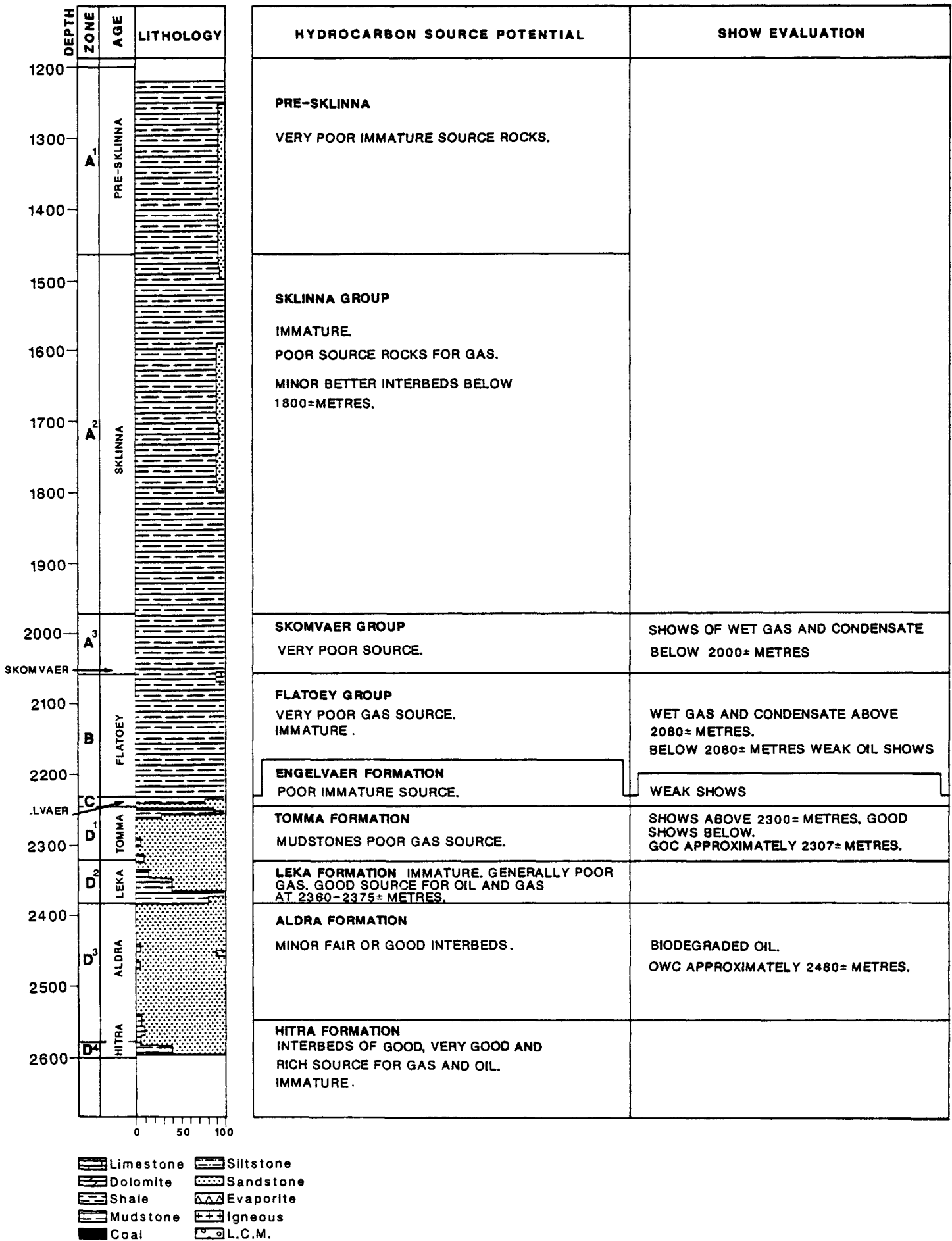
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FIGURE 1
WELL 6507/8-1

SUMMARY CHART





SOURCE ROCK EVALUATION AND HYDROCARBON CHARACTERISATION
STUDY OF STATOIL'S 6507/8-1 HALTENBANKEN WELL

EXECUTIVE SUMMARY

The section between 1200 metres and 2600 metres(TD) has been analysed in the 6507/8-1 well.

This entire interval is immature and hence, no hydrocarbon generation has occurred on this part of the structure. If mature, most of the sediments would only be poor and uninteresting source rocks for gas. The exceptions to this generation are:

- the mudstones at 2360-2375± metres in the Leka formation which are potentially good source rocks with a mixed potential for oil and gas.
- the interbeds of mudstone within the Aldra and Hitra formations which are commonly fair or good, but sometimes very good to very rich in the Hitra, source rocks for gas with variable proportions of associated oil. Only the uppermost 23 metres of the Hitra were penetrated in this well.

None of these source rocks could yield major oil.

There are weak shows of an unaltered, medium gravity crude oil within, and particularly towards the top of, the Flatoey group, with shows of wet gas and condensate extending up to 2000± metres in the Skomvaer group. This crude was derived from a similar but less mature source facies than that in the Tomma and Aldra sands. Within the Aldra formation the oil has been severely, but unequally, biodegraded and water washed within the reservoir and, as a result, is now heavier (23-25°API) and more viscous than the original oil. Biodegradation has also occurred within the Tomma formation, but has not been able to keep pace with the introduction of fresh oil into the reservoir. The gas-oil and oil-water contacts are at approximately 2307± metres and 2480± metres respectively.



Both the Flatoey and the Tomma-Aldra oils were derived from source rocks containing a high proportion of marine organic matter, but these source facies are not represented in the section penetrated by this well.

A handwritten signature in black ink, consisting of several overlapping, slanted lines that form a stylized representation of the name N.J.L. Bailey. A small "4-" is written to the right of the signature.

N.J.L. BAILEY
GEOCHEM LABORATORIES LIMITED

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) |
|-----------------------------|------------|---|-------------------------------------|--|
| 1555-001 | 1200-1250m | A 98% Silty clay, occ. aren grains, blocky, mod. soft, sl. calc., light olive grey Minor LCM - cement, igneous | 5Y6/1 | 0.49 |
| 1555-002 | 1250-1300m | A 95% Silty clay, as 1555-001A B 5% Sand, mod. to coarse grained, subangular, poorly sorted, white Minor igneous | 5Y6/1 N9 | 0.44 |
| 1555-003 | 1300-1350m | A 95% Silty clay, as 1555-001A B 5% Sand, as 1555-002B Minor quartzite | 5Y6/1 N9 | 0.36 |
| 1555-004 | 1350-1400m | A 95% Silty clay, as 1555-001A B 5% Sand, as 1555-002B | 5Y6/1 N9 | 0.36, 0.34 |
| 1555-005 | 1400-1450m | A 95% Clay, silty in part, blocky, mod. soft, sl. calc., light olive grey B 5% Sand, med. to coarse grained, subangular, poorly sorted, white Minor gyntgite | 5Y6/1 N9 | 0.38 |
| 1555-006 | 1450-1500m | A 95% Clay, as 1555-005A B 5% Sand, as 1555-005B | 5Y5/1 N9 | 0.51 |
| 1555-007 | 1500-1550m | A 98% Clay, sl. to mod. silty, blocky, mod. soft, sl. calc., light olive grey Minor sand, igneous | 5Y6/1 | 0.53 |
| 1555-008 | 1550-1600m | A 98% Clay, non. to sl. silty, blocky, mod. soft, sl. calc., light olive grey | 5Y6/1 | 0.62 |
| 1555-009 | 1600-1650m | A 90% Clay, sl. to very silty, blocky, mod. soft, sl. calc., light olive grey B 10% Sandstone, generally glauconitic, very fine to fine grained , angular to subround, fairly well sorted, calc., clay matrix, medium greenish grey to medium olive grey | 5Y6/1 5GY5/1- 5Y5/1 | 0.81 |
| 1555-010 | 1650-1700m | A 90% Clay, as 1555-009A B 10% Sandstone, as 1555-009B | 5Y6/1 5GY5/1- 5Y5/1 | 0.60 |
| 1555-011 | 1700-1750m | A 95% Clay, sl. to very silty, blocky mod. soft, sl. calc., medium olive grey to light olive grey B 5% Sandstone, as 1555-009B | 5Y5/1- 5Y6/1 5GY5/1- 5Y5/1 | 0.67, 0.65 |

Abbreviations = arenaceous, argillaceous, calcareous, Cut, dolomitic, Fluorescence, foraminifera, fossiliferous
Lost Circulation Material, moderately, occasionally, slightly, very

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|-----------------------------|------------|---|-------------------------|--|
| 1555-012 | 1750-1800m | A 90% Clay, sl. to very silty, blocky, mod. soft, sl. calc., olive grey | 5Y4/1 | 1.24 |
| | | B 10% Sandstone, gen. glauconitic, v. fine to fine grained, subangular to subround, mod. sorted, clay, calc., matrix, medium olive grey to medium greenish grey | 5Y5/1- 5GY5/1 | |
| 1555-013 | 1800-1850m | A 95% Silty mudstone, sub-platy, mod. hard, non-calc. to v. sl. calc., yellowish grey | 5Y8/1 | 0.93 |
| | | B 5% Clay, as 1555-012A | 5Y4/1 | 3.02 |
| 1555-014 | 1850-1900m | A 70% Mudstone, platy, mod. soft, non-calc., greenish grey | 5GY6/1 | 0.27 |
| | | B 20% Mudstone, sl. silty, platy, mod. soft, non-calc., olive grey | 5Y4/1 | 1.03 |
| | | C 10% Mudstone, platy, mod. soft, non-calc., bluish white | 5B9/1 | 0.59 |
| 1555-015 | 1900-1950m | A 95% Mudstone, as 1555-014A | 5GY6/1 | 0.14,0.17 |
| | | B 5% Mudstone, platy to sub-platy, mod. soft, non-calc., medium olive Minor light mudstone | 5Y3/1 | 1.38 |
| 1555-016 | 1950-2000m | A 50% Mudstone, as 1555-014A | 5GY6/1 | 0.11 |
| | | B 35% Mudstone, platy, mod. soft, non-calc., greyish red | 10R4/2 | 0.07 |
| | | C 15% Mudstone, platy to sub-platy, mod. soft, non-calc., medium greenish black Minor white mudstone | 5G3/1 | 0.43 |
| 1555-017 | 2000-2050m | A 60% Mudstone, platy to sub-platy, mod. soft, non-calc., greenish grey to light greenish grey | 5GY6/1 5GY8/1 | 0.15,0.14 |
| | | B 40% Mudstone, platy, mod. soft, non-calc., olive grey Minor red mudstone | 5Y4/1 | 0.52 |
| 1555-018 | 2050-2060m | A 98% Mudstone, platy to sub-platy, mod. soft, non-calc., medium light grey to greenish grey Minor limestone | N6-5G6/1 | 0.45 |
| 1555-019 | 2060-2070m | A 60% Mudstone, platy to sub-platy, mod. soft, non-calc., olive grey | 5Y4/1 | 1.00,1.01 |
| | | B 30% Mudstone, platy to sub-platy, mod. soft, non-calc., light olive grey | 5Y6/1 | 0.30 |
| | | C 10% Limestone, blocky to sub-platy, soft, bluish white Minor red mudstone | 5B9/1 | 0.15 |

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Lost Circulation Material, moderately, occasionally, slightly, very

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|-----------------------------|------------|-------|---|-------------------------|--|
| 1555-020 | 2070-2080m | A 98% | Mudstone, platy to sub-platy, mod. soft, non-calc., medium light grey to greenish grey Minor darker mudstone | N6-5G6/1 | 0.40 |
| 1555-021 | 2080-2090m | A 90% | Mudstone, as 1555-020A | N6-5G6/1 | 0.29 |
| | | B 10% | Mudstone, platy to sub-platy, mod. soft, non-calc., olive grey Minor limestone | 5Y4/1 | 0.90 |
| 1555-022 | 2090-2150m | A 98% | Mudstone, sub-platy, mod. soft, non-calc., medium light grey to bluish grey Minor limestone, LCM | N6-5B6/1 | 0.90,0.91 |
| 1555-023 | 2150-2200m | A 98% | Mudstone, as 1555-022A | N6-5B6/1 | 0.88 |
| 1555-024 | 2200-2235m | A 90% | Mudstone, platy to sub-platy, mod. soft, non-calc., olive grey | 5Y4/1 | 1.02 |
| | | B 10% | Mudstone, platy to sub-platy, mod. soft, non-calc., medium greenish grey | 5GY7/1 | 0.44 |
| 1555-025 SWC | 2235.0m | A 98% | Silty mudstone, platy, mod. hard, non-calc., olive grey with thin sandstone stringers | 5Y4/1 | 1.76 |
| 1555-026 | 2235-2244m | A 75% | Mudstone, sl. to mod. silty, platy, mod. soft to mod. hard, non. to v. sl. calc., olive grey to medium grey | 5Y4/1-N5 | 1.12,1.14 |
| | | B 25% | Sand, med. grained, subangular to subround, fairly well sorted, white | N9 | |
| 1555-027 SWC | 2242.0m | A 98% | Sandstone, v. fine to fine grained, subangular to subround, argill. matrix, occ. carb. flecks, micaceous, medium olive grey | 5Y5/1 | 0.79 |
| 1555-028 SWC | 2243.5m | A 90% | Mudstone, silty, platy, mod. soft, non-calc., olive grey | 5Y4/1 | 1.04 |
| | | B 10% | Sandstone, v. fine grained, subangular to subround, argill. matrix, sl. micaceous, medium yellowish grey | 5Y7/1 | |
| 1555-029 SWC | 2246.5m | A 98% | Mudstone, sub-platy, soft, non-calc., olive black | 5Y2/1 | 1.31 |
| 1555-030 | 2244-2253m | A 70% | Sand, med. to coarse grained, subangular to subround, mod. sorted, pyritic, white | N9 | |
| | | B 20% | Mudstone, occ. sl. silty, platy to sub-platy, mod. hard, v. sl. calc., medium light grey | N6 | 1.16 |
| | | C 10% | Mudstone, as 1555-029A | 5Y2/1 | 1.46 |

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Lost Circulation Material, moderately, occasionally, slightly, very

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|-----------------------------|------------|-------|---|-------------------------|--|
| 1555-031 | 2262-2271m | A 98% | Sand, as 1555-030A Minor sandstone | N9 | |
| 1554-001 | 2269.44m | A 98% | Sandstone, fine to coarse grained, subangular to subround, poorly sorted, sl. micaceous, ext porous, Milky C, (impregnated with drilling mud?) pinkish grey to medium pinkish grey | 5YR8/1- 5YR7/1 | |
| 1555-032 | 2271-2280m | A 98% | Sand, as 1555-030A Minor LCM - miscouite, lignite, mudstone | N9 | |
| 1555-033 | 2280-2289m | A 98% | Sand, as 1555-030A Minor LCM - miscouite, metal, mudstone | N9 | |
| 1555-034 | 2289-2298m | A 95% | Sand, fine to coarse grained, subangular to subround, mod. sorted, pyritic, white | N9 | |
| | | B 5% | Mudstone, sub-platy, mod. hard, non-calc., olive grey Minor LCM - metal, miscouite | 5Y4/1 | 0.99 |
| 1554-002 | 2296.58m | A 98% | Sandstone, v. fine grained, subangular to subround, fairly well sorted, micaceous, argill. matrix, weak milky C, very light grey | N8 | |
| 1555-035 CORE | 2304.50m | A 98% | Sandstone, poorly consolidated, fine to coarse grained, subangular to subround, poorly sorted, occ. pyrites, large carbonaceous fragments, pinkish grey | 5YR8/1 | 12.80 (Carb. Sh) |
| 1555-036 CORE | 2306.50m | A 98% | Sandstone, poorly consolidated, fine to coarse grained, subangular to subround, mod. sorted, pyritic and micaceous, large carbonaceous fragments, pinkish grey | 5YR8/1 | 12.90 (Carb. Sh) |
| 1554-003 | 2309.39m | A 98% | Sandstone, v. fine grained, subangular to subround, fairly well sorted, micaceous, argill. laminae, white F, strong milky C light olive grey | 5Y6/1 | |
| 1555-037 | 2316-2325m | A 90% | Sand, fine to coarse grained, subangular to subround, poorly sorted, pyritic, white | N9 | |
| | | B 10% | Mudstone, platy, mod. hard, v. sl. calc., medium olive grey Minor limestone, LCM - metal, coal | 5Y5/1 | 0.86,0.81 |
| 1555-038 | 2325-2334m | A 98% | Sand, fine to med. grained, subangular, white Minor sandstone | N9 | |

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|-----------------------------|------------|--|-------------------------|---|
| 1555-039 | 2334-2343m | A 85% Sand, as 1555-038A B 15% Mudstone, platy, mod. hard, non-calc., medium light grey to greenish grey Minor limestone | N9 N6-5G6/1 | 0.77 |
| 1555-040 | 2343-2352m | A 85% Sand, as 1555-038A B 15% Mudstone, as 1555-039B Minor limestone | N9 B6-5G6/1 | 0.86 |
| 1555-041 | 2352-2361m | A 60% Sand, fine to med. grained, subangular to subround, mod. sorted, pyritic, white B 40% Mudstone, platy, mod. soft, non-calc., bluish grey to medium light grey | N9 5B6/1-N6 | 0.97 |
| 1555-042 | 2361-2370m | A 60% Sand, as 1555-041A B 40% Mudstone, sl. silty in part, blocky to sub-platy, mod. soft, non-calc., medium olive grey | N9 5Y5/1 | 1.23 |
| 1555-043 CORE | 2371.25m | A 98% Mudstone, silty, with occ. v. fine grained sandstone lenses, platy, mod. soft, non-calc., medium olive grey | 5Y5/1 | 1.12 |
| 1555-044 | 2370-2379m | A 80% Silty mudstone, blocky to platy, mod. soft, non-calc., olive grey B 20% Sand, fine to med. grained, subangular to subround, mod. sorted, pyritic, white | 5Y4/1 N9 | 1.13 |
| 1555-045 | 2379-2388m | A 95% Mudstone, silty in part, sub-platy, mod. hard, non. to sl. calc., medium grey to medium olive grey B 5% Sand, med. to coarse grained, subangular to subround, mod. sorted, white Minor LCM - cement, light green mudstone | N5-5Y5/1 N9 | 1.04 |
| 1555-046 | 2388-2397m | A 98% Sand, fine to coarse grained, subangular to subround, mod. sorted, occ. pyritic, white Minor mudstone (caved) | N9 | |
| 1555-047 | 2397-2406m | A 98% Sand, as 1555-046A Minor LCM - metal, miscouite | N9 | |
| 1554-004 | 2399.33m | A 98% Sandstone, v. fine grained, subangular to subround, fairly well sorted, argill. laminae, bright yellow F, streaming milky C, light olive grey | 5Y6/1 | |

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|-----------------------------|------------|---|-------------------------|--|
| 1555-048 | 2406-2415m | A 98% Sand, as 1555-046A Minor LCM - metal, muscovite Trace mudstone | N9 | |
| 1555-049 | 2415-2424m | A 98% Sand, as 1555-046A Minor LCM - metal. Trace mudstone | N9 | |
| 1554-005 | 2420.37m | A 98% Sandstone, fine grained, subangular to subround, fairly well sorted, occ. poorly developed argill. laminae, yellow F, instant milky C light olive brown | 5Y5/6 | |
| 1555-050 | 2424-2433m | A 98% Sand, fine to coarse grained, subangular to subround, mod. sorted, rare pyrites, white Minor LCM - metal, Trace mudstone | N9 | |
| 1555-051 | 2433-2442m | A 98% Sand, as 1555-050A Minor LCM - metal, mudstone | N9 | |
| 1555-052 | 2442-2451m | A 95 Sand, as 1555-050A B 5% Mudstone, sl. silty in part, platy, mod. hard, non-calc., olive grey Minor LCM - metal, limestone | N9 5Y4/1 | 1.26 |
| 1555-053 | 2451-2460m | A 90% Sand, fine to coarse grained, subangular to subround, mod. sorted, rare pyrites, common lithoclasts (igneous), very light grey to white B 10% LCM - cement | N8-9 | |
| 1555-054 | 2460-2469m | A 98% Sand, as 1555-053A Minor LCM - metal, cement. Trace mudstone | N8-9 | |
| 1554-006 | 2469.81m | A 98% Sandstone, fine grained, subangular to subround, fairly well sorted. Frequent argill laminae, incl. cross-bedding. Yellow F - instant milky C, medium yellowish brown | 10YR4/6 | |
| 1555-055 | 2469-2478m | A 95% Sand, as 1555-053A B 5% Silty mudstone, platy to sub-platy, mod. soft, non-calc., olive grey Minor LCM - metal | N8-9 5Y4/1 | 1.29 |
| 1555-056 | 2478-2487m | A 98% Sand, med. to coarse grained, subangular to subround, mod. sorted, occ. lithoclasts, white Minor LCM - metal. Trace mudstone | N9 | |

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Lost Circulation Material, moderately, occasionally, slightly, very

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|-----------------------------|------------|---|----------------------------|--|
| 1554-007 | 2483.34m | A 98% Sandstone, v. fine grained, subangular to subround, fairly well sorted, sl. micaceous, poorly developed bedding, very light grey | N8 | |
| 1555-057 | 2487-2502m | A 98% Sand, fine to coarse grained, subangular to subround, poorly sorted, rare lithoclasts, white Trace mudstone | N9 | |
| 1554-008 | 2490.30m | A 98% Sandstone, fine grained, subangular to subround, fairly well sorted, sl. micaceous, occ. poorly developed argill. laminae, occ. carbonaceous fragments, very light grey | N8 | |
| 1555-058 | 2502-2517m | A 98% Sand, as 1555-057A Minor silica flour | N9 | |
| 1555-059 | 2517-2532m | A 98% Sand, as 1555-057A Minor silica flour, mudstone | N9 | |
| 1555-060 | 2532-2547m | A 80% Sand, as 1555-057A B 20% Sandstone, partly silica flour, v. fine grained, argill/calc. matrix, soft, blocky, light grey to white Minor sandstone | N9 N7-9 | |
| 1555-061 | 2547-2562m | A 85% Sand, fine to coarse grained, subangular to subround, poorly sorted, B 10% Sandstone, as 1555-060B C 5% Silty mudstone, sub-platy, mod. soft, sl. calc., medium light grey to medium olive grey | N7-9 N6-5Y5/1 | 1.92 |
| 1555-062 | 2562-2577m | A 65% Sand, fine to coarse grained, subangular to subround, poorly sorted, occ. pyritic B 25% Sandstone, v. fine grained, argill. matrix, blocky, soft, very light grey to white C 10% Silty mudstone, as 1555-061C | N8-9 N6-5Y5/1 | 2.13 |
| 1555-063 | 2577-2592m | A 70% Sand, as 1555-062A B 25% Sandstone, as 1555-062B C 5% Silty mudstone, platy, mod. soft, non-calc., medium dark grey to medium grey | N8-9 N4-5 | 8.96 |
| 1555-064 | 2592-2600m | A 40% Sandstone, as 1555-062B B 30% Silty mudstone, sub-platy, soft, non-calc., very light grey C 20% Sand, as 1555-062A D 5% Silty mudstone, as 1555-063C E 5% Coaly mudstone, platy, mod. hard, non-calc., black to greyish black | N8-9 N8 N4-5 N1-2 | 1.76 8.20, 8.28 46.70 |

S24

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Lost Circulation Material, moderately, occasionally, slightly, very

TABLE 2A
 CONCENTRATION (μ L GAS/KG 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 | $\frac{iC_4}{nC_4}$ |
|-----------------------------|-----------|---------------------------|--------------------------|---------------------------|------------------------------|---------------------------|--|--|---------------------|--|---------------------|
| 1555-001 | 1200-1250 | 29272 | 90 | 43 | 29 | 23 | 29457 | 185 | 0.6 | 119 | 1.26 |
| 1555-002 | 1250-1300 | 283 | 40 | 17 | 21 | 47 | 408 | 125 | 30.6 | 129 | 0.45 |
| 1555-003 | 1300-1350 | 24718 | 167 | 90 | 32 | 22 | 25029 | 311 | 1.2 | 418 | 1.45 |
| 1555-004 | 1350-1400 | 14422 | 324 | 208 | 336 | 278 | 15568 | 1146 | 7.4 | 507 | 1.21 |
| 1555-005 | 1400-1450 | 7543 | 62 | 24 | 32 | 23 | 7684 | 141 | 1.8 | 32 | 1.39 |
| 1555-006 | 1450-1500 | 7704 | 65 | 22 | 42 | 35 | 7868 | 164 | 2.1 | 184 | 1.20 |
| 1555-007 | 1500-1550 | 5877 | 85 | 50 | 28 | 23 | 6063 | 186 | 3.1 | 151 | 1.22 |
| 1555-008 | 1550-1600 | 22754 | 231 | 291 | 70 | 40 | 23386 | 632 | 2.7 | 42 | 1.75 |
| 1555-009 | 1600-1650 | 33 | 18 | 29 | 2 | 8 | 90 | 57 | 63.3 | 57 | 0.25 |
| 1555-010 | 1650-1700 | 24993 | 313 | 391 | 236 | 263 | 26196 | 1203 | 4.6 | 39 | 0.90 |
| 1555-011 | 1700-1750 | 33843 | 423 | 486 | 324 | 386 | 35462 | 1619 | 4.6 | 208 | 0.84 |
| 1555-012 | 1750-1800 | 56618 | 609 | 717 | 465 | 805 | 59214 | 2596 | 4.4 | 182 | 0.58 |
| 1555-013 | 1800-1850 | 70944 | 666 | 561 | 333 | 509 | 73013 | 2069 | 2.8 | 219 | 0.65 |
| 1555-014 | 1850-1900 | 4295 | 77 | 92 | 89 | 152 | 4705 | 410 | 8.7 | 97 | 0.59 |
| 1555-015 | 1900-1950 | 17109 | 606 | 82 | 41 | 74 | 17912 | 803 | 4.5 | 18 | 0.55 |
| 1555-016 | 1950-2000 | 17892 | 852 | 82 | 51 | 114 | 18991 | 1099 | 5.8 | 21 | 0.45 |
| 1555-017 | 2000-2050 | 26135 | 2828 | 240 | 114 | 47 | 29364 | 3229 | 11.0 | 81 | 2.43 |
| 1555-018 | 2050-2060 | 29046 | 1730 | 1318 | 315 | 602 | 33011 | 3965 | 12.0 | 5633 | 0.52 |
| 1555-019 | 2060-2070 | 26973 | 1803 | 1339 | 319 | 530 | 30964 | 3991 | 12.9 | 367 | 0.60 |
| 1555-020 | 2070-2080 | 23031 | 1351 | 1066 | 251 | 464 | 26163 | 3132 | 12.0 | 427 | 0.54 |
| 1555-021 | 2080-2090 | 165 | 34 | 29 | 14 | 21 | 263 | 98 | 37.3 | 130 | 0.67 |
| 1555-022 | 2090-2150 | 467 | 245 | 1660 | 1164 | 3071 | 6607 | 6140 | 92.9 | 8825 | 0.38 |
| 1555-023 | 2150-2200 | 10742 | 2606 | 7251 | 2686 | 5781 | 29066 | 18324 | 63.0 | 7272 | 0.46 |
| 1555-024 | 2200-2235 | 35780 | 8658 | 12785 | 4490 | 8086 | 69799 | 34019 | 48.7 | 8799 | 0.56 |
| 1555-026 | 2235-2244 | 21722 | 10265 | 15204 | 5562 | 13181 | 65934 | 44212 | 67.1 | 30361 | 0.42 |
| 1555-030 | 2244-2253 | 13847 | 6469 | 1823 | 3353 | 6709 | 32201 | 18354 | 57.0 | 7415 | 0.50 |
| 1555-031 | 2262-2271 | 6036 | 1208 | 1250 | 348 | 1233 | 10075 | 4039 | 40.1 | 11016 | 0.28 |
| 1555-032 | 2271-2280 | 13915 | 3254 | 2152 | 400 | 976 | 20697 | 6782 | 32.8 | 2966 | 0.41 |
| 1555-033 | 2280-2289 | 7434 | 1739 | 1212 | 244 | 522 | 11151 | 3717 | 33.3 | 822 | 0.47 |
| 1555-034 | 2289-2298 | 20182 | 3838 | 2971 | 3420 | 2280 | 32691 | 12509 | 38.3 | 5118 | 1.50 |



TABLE 2A
CONCENTRATION (μ L GAS/KG 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 | $\frac{iC_4}{nC_4}$ |
|-----------------------------|-----------|---------------------------|--------------------------|---------------------------|------------------------------|---------------------------|--|--|---------------------|--|---------------------|
| 1555-037 | 2316-2325 | 5427 | 1872 | 1886 | 717 | 1694 | 11596 | 6169 | 53.2 | 9015 | 0.42 |
| 1555-038 | 2325-2334 | 11439 | 3347 | 2677 | 4077 | 2464 | 24004 | 12565 | 52.3 | 45976 | 1.65 |
| 1555-039 | 2334-2343 | 16790 | 4630 | 4935 | 1717 | 4116 | 32188 | 15398 | 47.8 | 29505 | 0.42 |
| 1555-040 | 2343-2352 | 13915 | 4189 | 5344 | 2988 | 6403 | 32839 | 18924 | 57.6 | 47377 | 0.47 |
| 1555-041 | 2352-2361 | 2113 | 667 | 3012 | 1827 | 4949 | 12568 | 10455 | 83.2 | 29573 | 0.37 |
| 1555-042 | 2361-2370 | 61561 | 15120 | 15556 | 6522 | 12667 | 111426 | 49865 | 44.8 | 48628 | 0.51 |
| 1555-044 | 2370-2379 | 22110 | 5227 | 5363 | 2029 | 3447 | 38176 | 16066 | 42.1 | 11857 | 0.59 |
| 1555-045 | 2379-2388 | 16856 | 5893 | 7682 | 2233 | 4790 | 37454 | 20598 | 55.0 | 11385 | 0.47 |
| 1555-046 | 2388-2397 | 10269 | 2176 | 1809 | 639 | 1049 | 15942 | 5673 | 35.6 | 4160 | 0.61 |
| 1555-047 | 2397-2407 | 7758 | 1541 | 1318 | 587 | 1070 | 12274 | 4516 | 36.8 | 6488 | 0.55 |
| 1555-048 | 2406-2415 | 6210 | 1257 | 882 | 332 | 563 | 9244 | 3034 | 32.8 | 4536 | 0.59 |
| 1555-049 | 2415-2424 | 136 | 40 | 40 | 17 | 21 | 254 | 118 | 46.5 | 540 | 0.81 |
| 1555-050 | 2424-2433 | 4696 | 810 | 541 | 188 | 347 | 6582 | 1886 | 28.7 | 4227 | 0.54 |
| 1555-051 | 2433-2442 | 10102 | 1692 | 932 | 347 | 586 | 13659 | 3557 | 26.0 | 4598 | 0.59 |
| 1555-052 | 2442-2457 | 16558 | 2910 | 1578 | 879 | 1113 | 23038 | 6480 | 28.1 | 12282 | 0.79 |
| 1555-053 | 2451-2460 | 94981 | 13126 | 6255 | 3469 | 4574 | 122405 | 27424 | 22.4 | 100288 | 0.76 |
| 1555-054 | 2460-2469 | 4998 | 509 | 164 | 86 | 84 | 5841 | 843 | 14.4 | 760 | 1.02 |
| 1555-055 | 2469-2478 | 8232 | 1150 | 598 | 245 | 286 | 10511 | 2279 | 21.7 | 3641 | 0.86 |
| 1555-056 | 2478-2487 | 13714 | 1368 | 626 | 255 | 357 | 16320 | 2606 | 16.0 | 6475 | 0.71 |
| 1555-057 | 2487-2502 | 5617 | 860 | 543 | 174 | 280 | 7474 | 1857 | 24.8 | 8437 | 0.62 |
| 1555-058 | 2502-2517 | 10155 | 1638 | 1089 | 412 | 647 | 13941 | 3786 | 27.2 | 11263 | 0.64 |
| 1555-059 | 2517-2532 | 2561 | 433 | 218 | 87 | 91 | 3390 | 829 | 24.5 | 478 | 0.96 |
| 1555-060 | 2532-2547 | 16794 | 2844 | 1734 | 748 | 660 | 22780 | 5986 | 26.3 | 4396 | 1.13 |
| 1555-061 | 2547-2562 | 8563 | 2630 | 2067 | 763 | 890 | 14913 | 6350 | 42.6 | 6458 | 0.86 |
| 1555-062 | 2562-2577 | 36542 | 6040 | 2942 | 1008 | 795 | 47327 | 10785 | 22.8 | 2758 | 1.27 |
| 1555-063 | 2577-2592 | 41922 | 10901 | 5898 | 1740 | 1514 | 61975 | 20053 | 32.4 | 20 | 1.15 |
| 1555-064 | 2592-2600 | 4676 | 1710 | 811 | 203 | 225 | 7625 | 2949 | 38.7 | 1526 | 0.90 |



TABLE 2B
CONCENTRATION (μ L GAS/KG ROCK) OF C₁ - C₇ HYDROCARBONS IN CUTTINGS 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 | $\frac{iC_4}{nC_4}$ |
|-----------------------------|-----------|---------------------------|--------------------------|---------------------------|------------------------------|---------------------------|--|--|---------------------|--|---------------------|
| 1555-001 | 1200-1250 | 1962 | 10 | 11 | 68 | 27 | 2078 | 116 | 5.6 | 566 | 2.52 |
| 1555-002 | 1250-1300 | 323 | 34 | 36 | 50 | 29 | 472 | 149 | 31.6 | 55 | 1.72 |
| 1555-003 | 1300-1350 | 995 | 39 | 38 | 20 | 54 | 1146 | 151 | 13.2 | 325 | 0.37 |
| 1555-004 | 1350-1400 | 871 | 52 | 50 | 136 | 198 | 1307 | 436 | 33.4 | 96 | 0.69 |
| 1555-005 | 1400-1450 | 1261 | 32 | 19 | 4 | 7 | 1323 | 62 | 4.7 | 371 | 0.57 |
| 1555-006 | 1450-1500 | 1524 | 49 | 48 | 51 | 193 | 1865 | 341 | 18.3 | 18 | 0.26 |
| 1555-007 | 1500-1550 | 1494 | 10 | 30 | 27 | 21 | 1582 | 88 | 5.6 | 80 | 1.29 |
| 1555-009 | 1600-1650 | 4265 | 275 | 742 | 544 | 302 | 6128 | 1863 | 30.4 | 1193 | 1.80 |
| 1555-010 | 1650-1700 | 2950 | 179 | 270 | 152 | 40 | 3591 | 641 | 17.9 | 755 | 3.80 |
| 1555-011 | 1700-1750 | 6783 | 364 | 500 | 386 | 172 | 8205 | 1422 | 17.3 | 1089 | 2.24 |
| 1555-012 | 1750-1800 | 4612 | 286 | 546 | 555 | 345 | 6344 | 1732 | 27.3 | 849 | 1.61 |
| 1555-013 | 1800-1850 | 12490 | 380 | 809 | 698 | 330 | 14707 | 2217 | 15.1 | 1029 | 2.12 |
| 1555-014 | 1850-1900 | 8210 | 203 | 299 | 274 | 253 | 9239 | 1029 | 11.1 | 390 | 1.08 |
| 1555-015 | 1900-1950 | 4581 | 439 | 110 | 55 | 69 | 5254 | 673 | 12.8 | 364 | 0.80 |
| 1555-016 | 1950-2000 | 2077 | 229 | 54 | 102 | 103 | 2565 | 488 | 19.0 | 20 | 0.99 |
| 1555-017 | 2000-2050 | 1357 | 386 | 108 | 86 | 104 | 2041 | 684 | 33.5 | 302 | 0.83 |
| 1555-018 | 2050-2060 | 2128 | 326 | 480 | 237 | 642 | 3813 | 1685 | 44.2 | 2593 | 0.37 |
| 1555-019 | 2060-2070 | 1521 | 241 | 436 | 164 | 523 | 2885 | 1364 | 47.3 | 1820 | 0.31 |
| 1555-020 | 2070-2080 | 1551 | 199 | 309 | 133 | 436 | 2628 | 1077 | 41.0 | 2080 | 0.31 |
| 1555-021 | 2080-2090 | 407 | 127 | 229 | 96 | 260 | 1119 | 712 | 63.6 | 1189 | 0.37 |
| 1555-022 | 2090-2150 | 615 | 245 | 952 | 390 | 3639 | 5841 | 5226 | 89.5 | 32192 | 0.11 |
| 1555-023 | 2150-2200 | 639 | 353 | 1901 | 1525 | 4816 | 9234 | 8595 | 93.1 | 29466 | 0.32 |
| 1555-024 | 2200-2235 | 2107 | 1048 | 3613 | 7077 | 14897 | 28742 | 26635 | 92.7 | 38919 | 0.48 |
| 1555-026 | 2235-2244 | 770 | 340 | 653 | 404 | 1429 | 3596 | 2826 | 78.6 | 11969 | 0.28 |
| 1555-030 | 2244-2253 | 2987 | 597 | 1086 | 725 | 2167 | 7562 | 4575 | 60.5 | 3344 | 0.33 |
| 1555-031 | 2262-2271 | 2646 | 102 | 92 | 74 | 216 | 3130 | 484 | 15.5 | 2306 | 0.34 |
| 1555-032 | 2271-2280 | 2113 | 348 | 465 | 206 | 716 | 3848 | 1735 | 45.1 | 2349 | 0.29 |
| 1555-033 | 2280-2289 | 1469 | 298 | 445 | 184 | 477 | 2873 | 1404 | 48.9 | 627 | 0.39 |
| 1555-034 | 2289-2298 | 9562 | 485 | 257 | 748 | 1453 | 12505 | 2943 | 23.5 | 1606 | 0.51 |



TABLE 2B
 CONCENTRATION (μ L GAS/KG ROCK) OF C₁ - C₇ HYDROCARBONS IN CUTTINGS 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 | $\frac{iC_4}{nC_4}$ |
|-----------------------------|-----------|---------------------------|--------------------------|---------------------------|------------------------------|---------------------------|--|--|---------------------|--|---------------------|
| 1555-037 | 2316-2325 | 586 | 86 | 66 | 120 | 96 | 954 | 368 | 38.6 | 3554 | 1.25 |
| 1555-038 | 2325-2334 | 897 | 92 | 192 | 391 | 760 | 2332 | 1435 | 61.5 | 23653 | 0.51 |
| 1555-039 | 2334-2343 | 1890 | 282 | 722 | 671 | 1906 | 5471 | 3581 | 65.5 | 22529 | 0.35 |
| 1555-040 | 2343-2352 | 3366 | 340 | 601 | 651 | 2004 | 6962 | 3596 | 51.7 | 39707 | 0.32 |
| 1555-041 | 2352-2361 | 2012 | 413 | 2159 | 2505 | 7603 | 14692 | 12680 | 86.3 | 62731 | 0.33 |
| 1555-042 | 2361-2370 | 2740 | 984 | 2581 | 1861 | 5837 | 14003 | 11263 | 80.4 | 34511 | 0.32 |
| 1555-044 | 2370-2379 | 3066 | 983 | 3089 | 2176 | 5510 | 14824 | 11758 | 79.3 | 24792 | 0.39 |
| 1555-045 | 2379-2388 | 916 | 261 | 1460 | 755 | 2530 | 5922 | 5006 | 84.5 | 12910 | 0.30 |
| 1555-046 | 2388-2397 | 1268 | 402 | 1175 | 667 | 2000 | 5512 | 4244 | 77.0 | 8515 | 0.33 |
| 1555-047 | 2397-2407 | 766 | 102 | 214 | 173 | 333 | 1588 | 822 | 51.8 | 2596 | 0.52 |
| 1555-048 | 2406-2415 | 1174 | 115 | 243 | 206 | 400 | 2138 | 964 | 45.1 | 3474 | 0.51 |
| 1555-049 | 2415-2424 | 589 | 118 | 143 | 92 | 147 | 1089 | 500 | 45.9 | 1450 | 0.63 |
| 1555-050 | 2424-2433 | 477 | 33 | 43 | 48 | 95 | 696 | 219 | 31.5 | 3245 | 0.51 |
| 1555-051 | 2433-2442 | 825 | 77 | 93 | 72 | 112 | 1179 | 354 | 30.0 | 1970 | 0.64 |
| 1555-052 | 2442-2457 | 2879 | 258 | 345 | 129 | 534 | 4145 | 1266 | 30.5 | 12420 | 0.24 |
| 1555-053 | 2451-2460 | 3825 | 230 | 142 | 78 | 170 | 4445 | 620 | 13.9 | 22840 | 0.46 |
| 1555-054 | 2460-2469 | 1740 | 404 | 305 | 208 | 222 | 2879 | 1139 | 39.6 | 4034 | 0.94 |
| 1555-055 | 2469-2478 | 972 | 110 | 169 | 145 | 223 | 1619 | 647 | 40.0 | 6537 | 0.65 |
| 1555-056 | 2478-2487 | 572 | 41 | 33 | 31 | 64 | 741 | 169 | 22.8 | 2271 | 0.48 |
| 1555-057 | 2487-2502 | 791 | 30 | 29 | 12 | 36 | 898 | 107 | 11.9 | 1473 | 0.33 |
| 1555-058 | 2502-2517 | 2334 | 73 | 43 | 31 | 83 | 2564 | 230 | 9.0 | 3309 | 0.37 |
| 1555-059 | 2517-2532 | 1014 | 151 | 160 | 88 | 144 | 1557 | 543 | 34.9 | 2505 | 0.61 |
| 1555-060 | 2532-2547 | 2483 | 436 | 526 | 517 | 504 | 4466 | 1983 | 44.4 | 9945 | 1.03 |
| 1555-061 | 2547-2562 | 932 | 199 | 529 | 212 | 349 | 2221 | 1289 | 58.0 | 3240 | 0.61 |
| 1555-062 | 2562-2577 | 9078 | 4233 | 4218 | 1789 | 2717 | 22035 | 12957 | 58.8 | 21720 | 0.66 |
| 1555-063 | 2577-2592 | 10105 | 3707 | 9469 | 2439 | 4092 | 29812 | 19707 | 66.1 | 11458 | 0.60 |
| 1555-064 | 2592-2600 | 4255 | 797 | 1700 | 482 | 707 | 7941 | 3686 | 46.4 | 3024 | 0.68 |



TABLE 2C
TOTAL CONCENTRATION (μ L GAS/KG 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 | $\frac{iC_4}{nC_4}$ |
|-----------------------------|-----------|---------------------------|--------------------------|---------------------------|------------------------------|---------------------------|--|--|---------------------|--|---------------------|
| 1555-001 | 1200-1250 | 31234 | 100 | 54 | 97 | 50 | 31535 | 301 | 1.0 | 685 | 1.94 |
| 1555-002 | 1250-1300 | 606 | 74 | 53 | 71 | 76 | 880 | 274 | 31.1 | 184 | 0.93 |
| 1555-003 | 1300-1350 | 25713 | 206 | 128 | 52 | 76 | 26175 | 462 | 1.8 | 743 | 0.68 |
| 1555-004 | 1350-1400 | 15293 | 376 | 258 | 472 | 476 | 16875 | 1582 | 9.4 | 603 | 0.99 |
| 1555-005 | 1400-1450 | 8804 | 94 | 43 | 36 | 30 | 9007 | 203 | 2.3 | 403 | 1.20 |
| 1555-006 | 1450-1500 | 9228 | 114 | 70 | 93 | 228 | 9733 | 505 | 5.2 | 201 | 0.41 |
| 1555-007 | 1500-1550 | 7371 | 95 | 80 | 55 | 44 | 7645 | 274 | 3.6 | 231 | 1.25 |
| 1555-008 | 1550-1600 | 22754 | 231 | 291 | 70 | 40 | 23386 | 632 | 2.7 | 42 | 1.75 |
| 1555-009 | 1600-1650 | 4298 | 293 | 771 | 546 | 310 | 6218 | 1920 | 30.9 | 1250 | 1.76 |
| 1555-010 | 1650-1700 | 27943 | 492 | 661 | 388 | 303 | 29787 | 1844 | 6.2 | 793 | 1.28 |
| 1555-011 | 1700-1750 | 40626 | 787 | 986 | 710 | 558 | 43667 | 3041 | 7.0 | 1297 | 1.27 |
| 1555-012 | 1750-1800 | 61230 | 895 | 1263 | 1020 | 1150 | 65558 | 4328 | 6.6 | 1031 | 0.89 |
| 1555-013 | 1800-1850 | 83434 | 1046 | 1370 | 1031 | 839 | 87720 | 4286 | 4.9 | 1248 | 1.23 |
| 1555-014 | 1850-1900 | 12505 | 280 | 391 | 363 | 405 | 13944 | 1439 | 10.3 | 487 | 0.90 |
| 1555-015 | 1900-1950 | 21690 | 1045 | 192 | 96 | 143 | 23166 | 1476 | 6.4 | 382 | 0.67 |
| 1555-016 | 1950-2000 | 19969 | 1081 | 136 | 153 | 217 | 21556 | 1587 | 7.4 | 41 | 0.71 |
| 1555-017 | 2000-2050 | 27492 | 3214 | 348 | 200 | 151 | 31405 | 3913 | 12.5 | 383 | 1.32 |
| 1555-018 | 2050-2060 | 31174 | 2056 | 1798 | 552 | 1244 | 36824 | 5650 | 15.3 | 8225 | 0.44 |
| 1555-019 | 2060-2070 | 28494 | 2044 | 1775 | 483 | 1053 | 33849 | 5355 | 15.8 | 2186 | 0.46 |
| 1555-020 | 2070-2080 | 24582 | 1550 | 1375 | 384 | 900 | 28791 | 4209 | 14.6 | 2507 | 0.43 |
| 1555-021 | 2080-2090 | 572 | 161 | 258 | 110 | 281 | 1382 | 810 | 58.6 | 1319 | 0.39 |
| 1555-022 | 2090-2150 | 1082 | 490 | 2612 | 1554 | 6710 | 12448 | 11366 | 91.3 | 41016 | 0.23 |
| 1555-023 | 2150-2200 | 11381 | 2959 | 9152 | 4211 | 10597 | 38300 | 26919 | 70.3 | 36738 | 0.40 |
| 1555-024 | 2200-2235 | 37887 | 9706 | 16398 | 11567 | 22983 | 98541 | 60654 | 61.6 | 47718 | 0.50 |
| 1555-026 | 2235-2244 | 22492 | 10605 | 15857 | 5966 | 14610 | 69530 | 47038 | 67.7 | 42330 | 0.41 |
| 1555-030 | 2244-2253 | 16834 | 7066 | 2909 | 4078 | 8876 | 39763 | 22929 | 57.7 | 10759 | 0.46 |
| 1555-031 | 2262-2271 | 8682 | 1310 | 1342 | 422 | 1449 | 13205 | 4523 | 34.3 | 13323 | 0.29 |
| 1555-032 | 2271-2280 | 16028 | 3602 | 2617 | 606 | 1692 | 24545 | 8517 | 34.7 | 5314 | 0.36 |
| 1555-033 | 2280-2289 | 8903 | 2037 | 1657 | 428 | 999 | 14024 | 5121 | 36.5 | 1449 | 0.43 |
| 1555-034 | 2289-2298 | 29744 | 4323 | 3228 | 4168 | 3733 | 45196 | 15452 | 34.2 | 6723 | 1.12 |



TABLE 2C
TOTAL CONCENTRATION (μ L GAS/KG 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 | $\frac{iC_4}{nC_4}$ |
|-----------------------------|-----------|---------------------------|--------------------------|---------------------------|------------------------------|---------------------------|--|--|---------------------|--|---------------------|
| 1555-037 | 2316-2325 | 6013 | 1958 | 1952 | 837 | 1790 | 12550 | 6537 | 52.1 | 12569 | 0.47 |
| 1555-038 | 2325-2334 | 12336 | 3439 | 2869 | 4468 | 3224 | 26336 | 14000 | 53.2 | 69629 | 1.39 |
| 1555-039 | 2334-2343 | 18680 | 4912 | 5657 | 2388 | 6022 | 37659 | 18979 | 50.4 | 52034 | 0.40 |
| 1555-040 | 2343-2352 | 17281 | 4529 | 5945 | 3639 | 8407 | 39801 | 22520 | 56.6 | 87084 | 0.43 |
| 1555-041 | 2352-2361 | 4125 | 1080 | 5171 | 4332 | 12552 | 27260 | 23135 | 84.9 | 92304 | 0.35 |
| 1555-042 | 2361-2370 | 64301 | 16104 | 18137 | 8383 | 18504 | 125429 | 61128 | 48.7 | 83139 | 0.45 |
| 1555-044 | 2370-2379 | 25176 | 6210 | 8452 | 4205 | 8957 | 53000 | 27824 | 52.5 | 36650 | 0.47 |
| 1555-045 | 2379-2388 | 17772 | 6154 | 9142 | 2988 | 7320 | 43376 | 25604 | 59.0 | 24295 | 0.41 |
| 1555-046 | 2388-2397 | 11537 | 2578 | 2984 | 1306 | 3049 | 21454 | 9917 | 46.2 | 12675 | 0.43 |
| 1555-047 | 2397-2407 | 8524 | 1643 | 1532 | 760 | 1403 | 13862 | 5338 | 38.5 | 9084 | 0.54 |
| 1555-048 | 2406-2415 | 7384 | 1372 | 1125 | 538 | 963 | 11382 | 3998 | 35.1 | 8010 | 0.56 |
| 1555-049 | 2415-2424 | 725 | 158 | 183 | 109 | 168 | 1343 | 618 | 46.0 | 1990 | 0.65 |
| 1555-050 | 2424-2433 | 5173 | 843 | 584 | 236 | 442 | 7278 | 2105 | 28.9 | 7472 | 0.53 |
| 1555-051 | 2433-2442 | 10927 | 1769 | 1025 | 419 | 698 | 14838 | 3911 | 26.4 | 6568 | 0.60 |
| 1555-052 | 2442-2457 | 19437 | 3168 | 1923 | 1008 | 1647 | 27183 | 7746 | 28.5 | 24702 | 0.61 |
| 1555-053 | 2451-2460 | 98806 | 13356 | 6397 | 3547 | 4744 | 126850 | 28044 | 22.1 | 123128 | 0.75 |
| 1555-054 | 2460-2469 | 6738 | 913 | 469 | 294 | 306 | 8720 | 1982 | 22.7 | 4793 | 0.96 |
| 1555-055 | 2469-2478 | 9204 | 1260 | 767 | 390 | 509 | 12130 | 2926 | 24.1 | 10178 | 0.77 |
| 1555-056 | 2478-2487 | 14286 | 1409 | 659 | 286 | 421 | 17061 | 2775 | 16.3 | 8746 | 0.68 |
| 1555-057 | 2487-2502 | 6408 | 890 | 572 | 186 | 316 | 8372 | 1964 | 23.5 | 9910 | 0.59 |
| 1555-058 | 2502-2517 | 12489 | 1711 | 1132 | 443 | 730 | 16505 | 4016 | 24.3 | 14572 | 0.61 |
| 1555-059 | 2517-2532 | 3575 | 584 | 378 | 175 | 235 | 4947 | 1372 | 27.7 | 2983 | 0.74 |
| 1555-060 | 2532-2547 | 19277 | 3280 | 2260 | 1265 | 1164 | 27246 | 7969 | 29.2 | 14341 | 1.09 |
| 1555-061 | 2547-2562 | 9495 | 2829 | 2596 | 975 | 1239 | 17134 | 7639 | 44.6 | 9698 | 0.79 |
| 1555-062 | 2562-2577 | 45620 | 10273 | 7160 | 2797 | 3512 | 69362 | 23742 | 34.2 | 24477 | 0.80 |
| 1555-063 | 2577-2592 | 52027 | 14608 | 15367 | 4179 | 5606 | 91787 | 39760 | 43.3 | 11478 | 0.75 |
| 1555-064 | 2592-2600 | 8931 | 2507 | 2511 | 685 | 932 | 15566 | 6635 | 42.6 | 4550 | 0.73 |

TABLE 3

ROCKEVAL PYROLYSIS DATA

| GEOCHEM | | S1 | S2 | S3 | Production | Hydrogen | Oxygen | Tmax |
|-----------|-----------|--------|--------|--------|------------|----------|--------|------|
| SAMPLE | DEPTH | (mg/g) | (mg/g) | (mg/g) | INDEX | INDEX | INDEX | (°C) |
| 1555-001A | 1200-1250 | 0.05 | 0.52 | 1.42 | 0.09 | 106.1 | 289.8 | 422 |
| 1555-002A | 1250-1300 | 0.10 | 0.75 | 1.21 | 0.12 | 170.5 | 275.0 | 419 |
| 1555-003A | 1300-1350 | 0.07 | 0.42 | 1.13 | 0.14 | 116.7 | 313.9 | 412 |
| 1555-004A | 1350-1400 | 0.07 | 0.48 | 0.95 | 0.13 | 137.1 | 271.4 | 417 |
| 1555-005A | 1400-1450 | 0.07 | 0.38 | 1.43 | 0.16 | 100.0 | 376.3 | 422 |
| 1555-006A | 1450-1500 | 0.17 | 0.89 | 1.71 | 0.16 | 174.5 | 335.3 | 421 |
| 1555-007A | 1500-1550 | 0.23 | 1.17 | 1.72 | 0.16 | 220.8 | 324.5 | 426 |
| 1555-008A | 1550-1600 | 0.15 | 1.35 | 1.87 | 0.10 | 217.7 | 301.6 | 427 |
| 1555-009A | 1600-1650 | 0.11 | 0.82 | 1.56 | 0.12 | 101.2 | 192.6 | 418 |
| 1555-010A | 1650-1700 | 0.07 | 0.23 | 2.20 | 0.23 | 38.3 | 366.7 | 372 |
| 1555-011A | 1700-1750 | 0.11 | 0.91 | 1.68 | 0.11 | 137.9 | 254.5 | 415 |
| 1555-012A | 1750-1800 | 0.13 | 2.37 | 2.28 | 0.05 | 191.1 | 183.9 | 423 |
| 1555-013A | 1800-1850 | 0.16 | 1.92 | 1.36 | 0.08 | 206.5 | 146.2 | 417 |
| 1555-013B | 1800-1850 | 2.87 | 2.95 | 2.53 | 0.49 | 121.9 | 104.5 | 411 |
| 1555-014A | 1850-1900 | 0.06 | 0.18 | 1.01 | 0.25 | 66.7 | 374.1 | 383 |
| 1555-014B | 1850-1900 | 0.11 | 1.85 | 1.41 | 0.06 | 179.6 | 136.9 | 423 |
| 1555-015B | 1900-1950 | 0.11 | 3.68 | 2.11 | 0.03 | 266.7 | 152.9 | 429 |
| 1555-016C | 1950-2000 | 0.04 | 0.19 | 1.41 | 0.17 | 44.2 | 327.9 | 404 |
| 1555-017B | 2000-2050 | 0.07 | 0.48 | 1.26 | 0.13 | 92.3 | 242.3 | 426 |
| 1555-018A | 2050-2060 | 0.29 | 0.06 | 1.05 | 0.83 | 13.3 | 233.3 | 377 |
| 1555-019A | 2060-2070 | 0.10 | 0.39 | 1.87 | 0.20 | 39.0 | 187.0 | 412 |
| 1555-020A | 2070-2080 | 0.10 | 0.12 | 0.77 | 0.45 | 30.0 | 192.5 | 374 |
| 1555-021B | 2080-2090 | 0.07 | 0.24 | 1.72 | 0.23 | 26.7 | 191.1 | 415 |
| 1555-022A | 2090-2150 | 0.09 | 0.30 | 1.46 | 0.23 | 33.3 | 162.2 | 414 |
| 1555-023A | 2150-2200 | 0.09 | 0.50 | 1.07 | 0.15 | 56.8 | 121.6 | 426 |
| 1555-024A | 2200-2235 | 0.20 | 1.30 | 2.13 | 0.13 | 127.5 | 208.8 | 431 |
| 1555-025A | 2235.0 | 0.07 | 0.56 | 0.57 | 0.11 | 31.8 | 32.4 | 417 |
| 1555-026A | 2235-2244 | 0.08 | 0.97 | 1.06 | 0.08 | 85.8 | 93.8 | 431 |
| 1555-027A | 2242.0 | 0.01 | 0.17 | 0.57 | 0.06 | 21.5 | 72.2 | 420 |
| 1555-028A | 2243.5 | 0.02 | 0.18 | 0.49 | 0.10 | 17.3 | 47.1 | 419 |
| 1555-030B | 2244-2253 | 0.29 | 1.78 | 1.09 | 0.14 | 153.4 | 94.0 | 428 |
| 1555-030C | 2244-2253 | 0.53 | 2.31 | 1.69 | 0.19 | 158.2 | 115.8 | 424 |
| 1555-029A | 2246.5 | 0.02 | 0.30 | 0.55 | 0.06 | 22.9 | 42.0 | 422 |
| 1555-034B | 2289-2298 | 0.26 | 1.28 | 1.13 | 0.17 | 129.3 | 114.1 | 428 |
| 1555-037B | 2316-2325 | 0.06 | 0.44 | 1.18 | 0.12 | 52.4 | 140.5 | 427 |
| 1555-039B | 2334-2343 | 0.05 | 0.28 | 1.30 | 0.15 | 36.4 | 168.8 | 424 |
| 1555-040B | 2343-2352 | 0.19 | 0.81 | 1.00 | 0.19 | 94.2 | 116.3 | 427 |
| 1555-041B | 2352-2361 | 0.08 | 1.05 | 1.29 | 0.07 | 108.2 | 133.0 | 431 |
| 1555-042B | 2361-2370 | 0.46 | 3.87 | 1.03 | 0.11 | 314.6 | 83.7 | 429 |
| 1555-044A | 2370-2379 | 0.17 | 2.76 | 0.91 | 0.06 | 244.2 | 80.5 | 429 |
| 1555-043A | 2371.25 | 0.18 | 4.17 | 0.70 | 0.04 | 372.3 | 62.5 | 428 |
| 1555-045A | 2379-2388 | 0.08 | 1.64 | 1.04 | 0.05 | 157.7 | 100.0 | 431 |
| 1555-052B | 2442-2451 | 0.49 | 2.88 | 1.08 | 0.15 | 228.6 | 85.7 | 432 |
| 1555-055B | 2469-2478 | 0.75 | 4.68 | 0.79 | 0.14 | 362.8 | 61.2 | 430 |
| 1555-061C | 2547-2562 | 0.23 | 2.75 | 1.18 | 0.08 | 143.2 | 61.5 | 426 |
| 1555-062C | 2562-2577 | 0.25 | 4.00 | 1.28 | 0.06 | 187.8 | 60.1 | 427 |
| 1555-063C | 2577-2592 | 0.60 | 13.31 | 2.90 | 0.04 | 148.5 | 32.4 | 429 |
| 1555-064D | 2592-2600 | 0.62 | 17.08 | 3.50 | 0.04 | 207.3 | 42.5 | 426 |
| 1555-064E | 2592-2600 | 3.00 | 140.60 | 12.20 | 0.02 | 301.1 | 26.1 | 425 |

TABLE 4
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₊ | % $\frac{C_1 - C_5}{TOTAL}$ |
| 1555-012A | 1750-1800 | 15.14 | 29.02 | 55.84 | 0.00 | 44.16 |
| 1555-013B | 1800-1850 | 15.33 | 26.30 | 50.80 | 7.58 | 41.63 |
| 1555-014B | 1850-1900 | 67.69 | 16.55 | 15.75 | 0.00 | 84.25 |
| 1555-015B | 1900-1950 | 10.61 | 36.19 | 47.78 | 5.41 | 46.80 |
| 1555-030B | 2244-2253 | 20.15 | 22.55 | 56.16 | 1.14 | 42.70 |
| 1555-030C | 2244-2253 | 38.49 | 29.17 | 29.40 | 2.93 | 67.66 |
| 1555-034B | 2289-2298 | 58.25 | 15.77 | 24.70 | 1.29 | 74.01 |
| 1555-035A | 2304.5 | 52.92 | 19.18 | 27.90 | 0.00 | 72.10 |
| 1555-041B | 2352-2361 | 61.57 | 25.69 | 12.75 | 0.00 | 87.25 |
| 1555-042B | 2361-2370 | 16.56 | 23.10 | 56.14 | 4.20 | 39.67 |
| 1555-044A | 2370-2379 | 24.90 | 30.81 | 41.99 | 2.29 | 55.71 |
| 1555-043A | 2371.25 | 10.98 | 24.22 | 58.45 | 6.35 | 35.20 |
| 1555-045A | 2379-2388 | 32.19 | 36.64 | 31.16 | 0.00 | 68.84 |
| 1555-052B | 2442-2451 | 25.59 | 30.13 | 41.65 | 2.64 | 55.71 |
| 1555-055B | 2469-2478 | 18.34 | 30.00 | 43.70 | 7.96 | 48.34 |
| 1555-061C | 2547-2562 | 24.10 | 36.15 | 39.75 | 0.00 | 60.25 |
| 1555-062C | 2562-2577 | 13.43 | 29.78 | 49.10 | 7.70 | 43.21 |
| 1555-063C | 2577-2592 | 32.49 | 18.96 | 46.28 | 2.27 | 51.45 |
| 1555-064D | 2592-2600 | 14.47 | 33.35 | 48.46 | 3.71 | 47.82 |
| 1555-064E | 2592-2600 | 17.32 | 30.06 | 43.72 | 8.90 | 47.38 |

TABLE 5
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 6507/8-1</u> | | | | | | | | |
| 1555-001A | 1200-1250m | W;H-I;Al-Am | significant H at 2- and 2- to 2 | 45 | F-M | F | 1+ to 2- | 2 |
| 1555-003A | 1300-1350m | W;I-H;Al-Am | contamination, H at 2- and 2- to 2 | 50 | F-M | F | 1+ to 2- | 2 |
| 1555-005A | 1400-1450m | W;H-I;Al | contamination, H at 2- and 2- to 2 | 50 | F-M | F-G | 1+ to 2- | 2 |
| 1555-007A | 1500-1550m | W;I-H;Al-Am | abundant contamination, dominant H at 2- and 2- to 2 | 50 | F-M | F | 1+ to 2-(?) | 2(?) |
| 1555-009A | 1600-1650m | W;I-H;Al | H at 2- | 35 | F-M | F | 1+ to 2- | 2 |
| 1555-011A | 1700-1750m | W;H-I;Al-Am | H at 2- | 30 | F-M | F | 1+ to 2- | 2 |
| 1555-012A | 1750-1800m | W;H-I;Al-Am | H at 2- | 25 | F-M | F-G | 1+ to 2- | 2 |
| 1555-013B | 1800-1850m | W;H;I-Am | H at 2-, significant amorphous like material, believed to be contamination | - | F-M | G | 1+ to 2- | 2 |
| 1555-014B | 1850-1900m | W;H-I;Al-Am | contamination | 30 | F-M | F | 1+ to 2- | 2 |
| 1555-017B | 2000-2050m | I-H;W;Al | organic matter obscured by pyrite, differentiation difficult | 55 | F-M | F | 1+ to 2- | 2 |
| 1555-019A | 2060-2070m | I;W-H;- | abundant contamination dominant H at 2- | 80 | F-M | F | 1+ to 2-(?) | 2(?) |
| 1555-021B | 2080-2090m | I-W;H;- | abundant contamination, significant H at 2- | 75 | F-M | F | 1+ to 2-(?) | 2(?) |
| 1555-023A | 2150-2020m | I;W-H;Al | abundant contamination dominant H at 2- | 85 | F-M | F | 1+ to 2-(?) | 2(?) |

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 5
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 |
| 1555-025A | 2235.0m | I;H-W;Al (-Am) | H at 2- | 80 | F-M/C | G | 1+ to 2- | 2 |
| 1555-028A | 2243.5m | I;H-W;Al | significant H at 2- | 80 | F-M | G | 1+ to 2- | 2 |
| 1555-029A | 2246.5m | I;H-W;Al | significant H at 2- | 80 | F-M | G | 1+ to 2- | 2 |
| 1555-034B | 2289-2298m | I;W-H;Al | contamination dominant H at 2- | 70 | F-M | F | 1+ to 2-(?) | 2(?) |
| 1555-039B | 2334-2343m | I;W-H;Al | H at 2- | 70 | F-M | F-G | 1+ to 2-(?) | 2(?) |
| 1555-043A | 2371.25m | H;W-I;Am-Al | sapropelisation significant H at 2- | - | F-M | F-G | 1+ to 2- | 2 |
| 1555-045A | 2379-2388m | I;W-H;Al | contamination significant H at 2- | 80 | M | G | 1+ to 2-/2- | 2.5 |
| 1555-052B | 2442-2457m | H-W;I;Al-Am | H at 2- | - | M(-C) | G | 1+ to 2-/2- | 2.5 |
| 1555-055B | 2469-2478m | H;W-I;Am-Al | H at 2-, sapropelisation | - | F-M/C | G | 1+ to 2- | 2 |
| 1555-061C | 2547-2562m | -;H-W-I-Am*;Al | * very finely disseminated unrecognisable significant H at 2- | - | F-M/C | F-G | 1+ to 2-/2- | 2.5 |
| 1555-064D | 2592-2600m | -;W-Am*-H-I;Al | * generally as 061C | - | F-M | F | 2- | 3 |

L13

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 COMPOSITION

Well 6507/8-1

| GEOCHEM SAMPLE NUMBER | DEPTH (m) | AM | VISUAL ESTIMATE (%) | | | |
|-----------------------------|--------------|-----|---------------------|----|----|----|
| | | | A1 | H | W | I |
| 1555-001A | 1200-1250 | 1 | <10 | 25 | 45 | 25 |
| 1555-003A | 1300-1350 | 1 | < 5 | 20 | 50 | 25 |
| 1555-005A | 1400-1450 | - | < 5 | 30 | 45 | 25 |
| 1555-007A | 1500-1550 | 1 | <10 | 20 | 45 | 30 |
| 1555-009A | 1600-1650 | - | < 5 | 15 | 55 | 25 |
| 1555-011A | 1700-1750 | 1 | <10 | 25 | 50 | 10 |
| 1555-012A | 1750-1800 | < 5 | 15 | 30 | 50 | 10 |
| 1555-013B | 1800-1850 | <10 | 1 | 30 | 55 | 10 |
| 1555-014B | 1850-1900 | < 5 | <10 | 30 | 45 | 15 |
| 1555-017B | 2000-2050 | - | < 5 | 35 | 20 | 45 |
| 1555-019A | 2060-2070 | - | - | 15 | 30 | 55 |
| 1555-021B | 2080-2090 | - | - | 15 | 35 | 50 |
| 1555-023A | 2150-2200 | - | < 5 | 10 | 30 | 60 |
| 1555-025A | 2235.0 | 1 | 1 | 20 | 15 | 65 |
| 1555-028A | 2243.5 | - | 1 | 20 | 15 | 60 |
| 1555-029A | 2246.5 | - | < 5 | 30 | 25 | 45 |
| 1555-034B | 2289-2298 | - | <10 | 20 | 30 | 40 |
| 1555-039B | 2334-2343 | - | 1 | 20 | 25 | 55 |
| 1555-043A | 2371.5 | <10 | <10 | 40 | 30 | 20 |
| 1555-045A | 2379-2388 | - | 1 | 15 | 15 | 70 |
| 1555-052B | 2442-2451 | 1 | < 5 | 45 | 35 | 20 |
| 1555-055B | 2469-2478 | <10 | < 5 | 40 | 30 | 20 |
| 1555-061C | 2547-2562 | 10 | < 5 | 40 | 30 | 20 |
| 1555-064D | 2592-2600 | 25 | <10 | 20 | 35 | 15 |

TABLE 7
VITRINITE REFLECTANCE DATA



| GEOCHEM SAMPLE NUMBER | DEPTH | SAMPLE TYPE | AVERAGE REFLECTIVITY R _o (%), (NUMBER OF PARTICLES) | | | REMARKS |
|-----------------------------|------------|----------------|---|------------|------------|---------|
| | | | 1 | 2 | 3 | |
| <u>Well 6507/8-1</u> | | | | | | |
| 1555-001A | 1200-1250m | | 0.33 (7) | 0.45 (3) | | |
| 1555-003A | 1250-1300m | | <u>0.29 (20)</u> | | | |
| 1555-005A | 1400-1450m | WR | 0.37 (13) | 0.55 (1) | | |
| 1555-007A | 1500-1550m | WR | 0.36 (1) | 0.45 (1) | 0.63 (1) | |
| 1555-009A | 1600-1650m | WR | 0.46 (7) | 0.65 (2) | 0.78 (1) * | |
| 1555-011A | 1700-1750m | WR | <u>0.35 (12)</u> | 1.07 (1) * | | |
| 1555-012A | 1750-1800m | WR | <u>0.36 (13)</u> | | | |
| 1555-013B | 1800-1850m | WR | <u>0.34 (13)</u> | | | |
| 1555-014B | 1850-1900m | WR | <u>0.35 (6)</u> | | | |
| 1555-017B | 2000-2050m | WR | 0.75 (1) | | | |
| 1555-019A | 2060-2070m | WR | <u>0.39 (1)</u> 0.95 (7) | 0.57 (2) | 0.75 (3) * | |
| 1555-021B | 2080-2090m | WR | <u>0.37 (1)</u> 0.88 (1) | 0.50 (2) | 0.73 (2) | |
| 1555-023B | 2150-2220m | WR | 0.53 (3) 1.04 (7) | 0.69 (4) | 0.87 (5) * | |
| 1555-025A | 2235.0m | KC | <u>0.39 (21)</u> | | | |
| 1555-028A | 2243.5m | WR | 0.47 (2) | 0.62 (16) | 0.79 (2) * | |
| 1555-029A | 2246.5m | WR | <u>0.38 (1)</u> | 0.59 (19) | | |
| 1555-034A | 2289-2298m | WR | 0.66 (1) | | | |
| 1555-035B | 2304.5m | WR | <u>0.39 (40)</u> | | | |
| 1555-039B | 2334-2343m | WR | <u>0.41 (1)</u> 0.76 (3) | 0.50 (5) | 0.64 (11) | |
| 1555-043A | 2371.25m | WR | 0.31 (3) | 0.41 (3) | 0.66 (9) | |
| 1555-045A | 2379-2388m | WR | 0.54 (4) | 0.69 (11) | 0.82 (4) * | |
| 1555-052B | 2442-2457m | WR | <u>0.42 (8)</u> | | | |
| 1555-055B | 2469-2478m | WR | <u>0.46 (6)</u> 1.04 (2) | 0.65 (6) | 0.80 (1) * | |
| 1555-061C | 2547-2562m | KC | <u>0.44 (37)</u> 1.05 (1) | 0.63 (9) | 0.90 (3) * | |
| 1555-064E | 2592-2600m | WR | <u>0.42 (50)</u> | | | |

CT-113
Rich cuttings; CO—core; WR—whole rock; KC—kerogen concentrate.

Preferred values underlined. *Reworked